

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Applicant:** ASKEY COMPUTER CORP.  
10F, NO.119, JIANKANG RD.,  
ZHONGHE DIST., NEW TAIPEI CITY 23585,  
TAIWAN, R.O.C.

**Product Name:** Wireless module

**Brand Name:** Panasonic

**Model No.:** WLU5540B-D81(RoHS)

**Model Difference:** N/A

**FCC ID:** H8N-WLU5540B

**Report Number:** E2/2018/70031

**FCC Rule Part:** §15.247, Cat: DTS

**Issue Date:** Aug. 07, 2018

**Date of Test:** Jul. 09, 2018~ Aug. 23, 2018

**Date of EUT Re-  
ceived:** Jul. 09, 2018

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

**Tested By:**

*Aken Huang*  
**Aken Huang / Engineer**

**Approved By:**

*Jim Chang*  
**Jim Chang / Manager**



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## Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
E2/2018/70031	Rev.00	Initial creation of document	All	Apr. 07, 2018	Stefanie Yu / Clerk

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# 1 GENERAL INFORMATION

## 1.1 Product description

### General:

Product Name:	Wireless module
Brand Name:	Panasonic
Model No.:	WLU5540B-D81(RoHS)
Model Difference:	N/A
Hardware Version (Product):	REV5
Operation system:	Ubuntu 12.04.1
QA tool version:	v.63770
WLAN driver Version:	V 2.0.1
MTK BT Driver Version:	V6.1.17060901
Power Supply:	5Vdc from USB Port

### WLAN 2.4GHz:

WLAN	Frequency Range	Channels	Rated Power (dBm)	Modulation Technology
802.11b	2412-2462	11	22.97	DSSS
802.11g			28.72	OFDM
802.11n HT20			28.97 (MIMO)	
802.11n HT40	2422-2452	7	28.56 (MIMO)	
Antenna Designation:	Printed Antenna, Gain: 3.07 (Main) / 3.07dBi (Aux)			
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition Rate:	802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps			

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## 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance v05

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

## 1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd.,  
Guishan District, Taoyuan City, Taiwan 333

(TAF code 0513)

FCC Registration Numbers are: 735305 / TW0002

## 1.4 Special Accessories

There are no special accessories used while test was conducted.

## 1.5 Equipment Modifications

There was no modification incorporated into the EUT.

## 1.6 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m\*9m\*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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## 2 SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

### 2.4 Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

#### Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

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## 2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration



Fig. 2-2 Conducted (Antenna Port) Emission Configuration

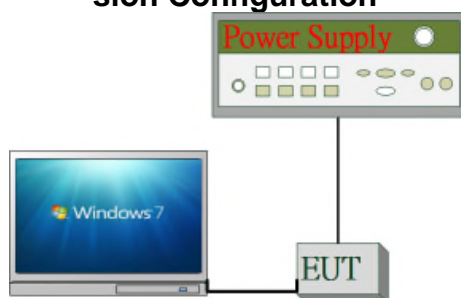


Fig. 2-3 Conducted (AC powerline) Emission Configuration



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	T420	S0012599	Shielded	Unshielded
3.	DC Power Supply	Agilent	E3640A	MY53130054	N/A	Unshielded

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### 3 SUMMARY OF TEST RESULTS

FCC Rules / IC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB & 99% Emission Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

### 4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n\_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	8	2447 MHz
2	2417 MHz	9	2452 MHz
3	2422 MHz	10	2457 MHz
4	2427 MHz	11	2462 MHz
5	2432 MHz		
6	2437 MHz		
7	2442 MHz		

7 channels are provided for 802.11n\_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	8	2447 MHz
4	2427 MHz	9	2452 MHz
5	2432 MHz		
6	2437 MHz		
7	2442 MHz		

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## 4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.

### RADIATED EMISSION TEST:

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
<b>RADIATED EMISSION TEST (BELOW 1 GHz)</b>					
802.11g	1 to 11	1,6,11	OFDM	6	2TX
<b>RADIATED EMISSION TEST (ABOVE 1 GHz)</b>					
802.11b	1 to 11	1,6,11	DSSS	1	2TX
802.11g	1 to 11	1,6,11	OFDM	6	2TX
802.11n (HT20)	1 to 11	1,2,6,10,11	OFDM	MCS 8	MIMO
802.11n (HT40)	3 to 9	3,4,5,6,7,8,9	OFDM	MCS 8	MIMO

**Note:**  
The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

### ANTENNA PORT CONDUCTED MEASUREMENT:

<b>CONDUCTED TEST</b>					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1,6,11	DSSS	1	2TX
802.11g	1 to 11	1,6,11	OFDM	6	2TX
802.11n (HT20)	1 to 11	1,2,6,10,11	OFDM	MCS 8	MIMO
802.11n (HT40)	3 to 9	3,4,5,6,7,8,9	OFDM	MCS 8	MIMO

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## 5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : <b>Vertical</b> )	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : <b>Horizontal</b> )	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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## 6 CONDUCTED EMISSION TEST

### 6.1 Standard Applicable

Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
<b>Note</b> 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

### 6.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI 7	100950	12/24/2017	12/23/2018
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	08/30/2017	08/29/2018
LISN	Schwarzbeck	NSLK 8127	8127-648	06/18/2018	06/17/2019
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

### 6.3 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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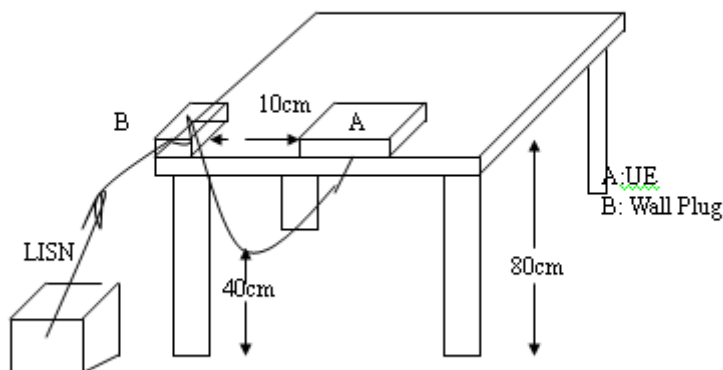
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## 6.4 Test SET-UP (Block Diagram of Configuration)



## 6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

## 6.6 Measurement Result

Note: Refer to next page for measurement data and plots.

Note2: The \* reveals the worst-case results that closet to the limit

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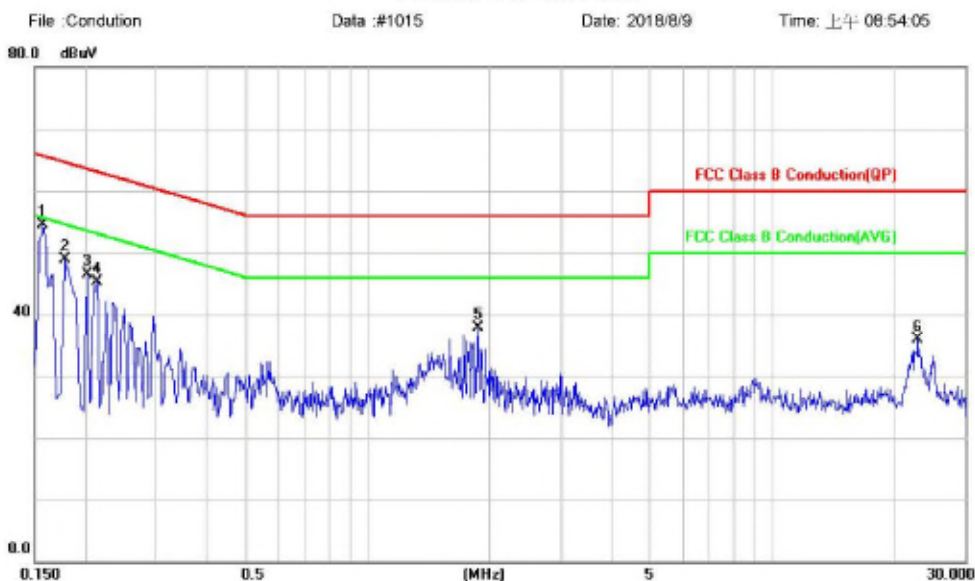
## AC POWER LINE CONDUCTED EMISSION TEST DATA

Site : Conduction Room  
Limit: FCC Class B Conduction(QP)  
Mode:  
Note:

Phase: L1  
Power: AC 120V/60Hz

Temperature: 23 °C  
Humidity: 69 %

## Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1580	34.91	19.67	54.58	65.57	-10.99	peak	
2		0.1780	29.14	19.70	48.84	64.58	-15.74	peak	
3		0.2020	26.67	19.74	46.41	63.53	-17.12	peak	
4		0.2140	25.57	19.76	45.33	63.05	-17.72	peak	
5		1.8700	17.34	20.47	37.81	56.00	-18.19	peak	
6		22.9340	15.84	20.10	35.94	60.00	-24.06	peak	

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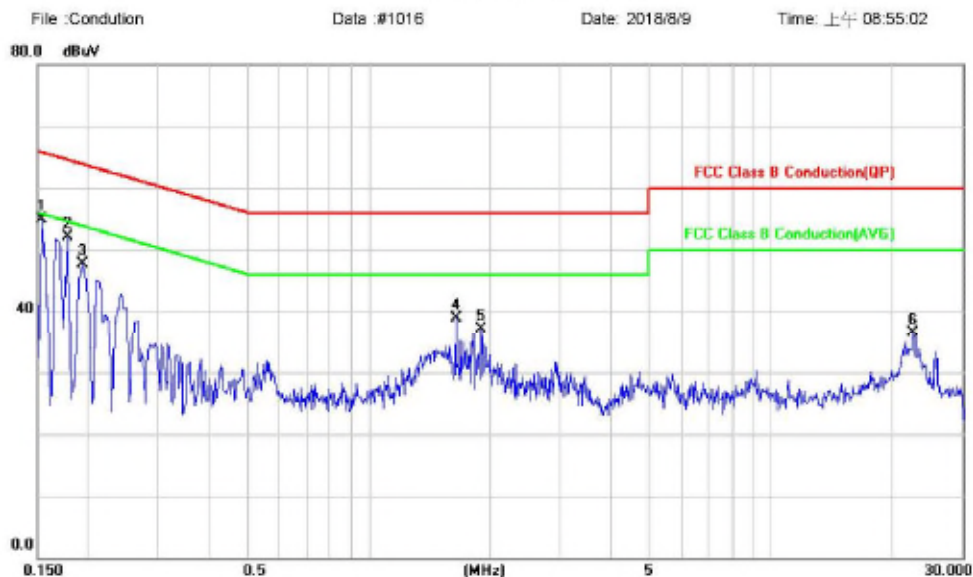
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Site : Conduction Room Phase: **N** Temperature: 23 °C  
Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 69 %  
Mode:  
Note:

## Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1540	35.17	19.65	54.82	65.78	-10.96	peak	
2		0.1780	32.40	19.69	52.09	64.58	-12.49	peak	
3		0.1940	27.97	19.71	47.68	63.86	-16.18	peak	
4		1.6500	18.60	20.29	38.89	56.00	-17.11	peak	
5		1.8980	16.61	20.47	37.08	56.00	-18.92	peak	
6		22.6260	16.29	20.12	36.41	60.00	-23.59	peak	

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## 7 DUTY CYCLE OF TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

### Formula:

Duty Cycle = Ton / (Ton+Toff)

### Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

### Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)	1/T (kHz)	VBW setting (kHz)
802.11b	100.00	0.00	0.05	1.00
802.11g	97.53	0.11	0.72	1.00
802.11n_20	94.91	0.23	1.49	2.00
802.11n_40	90.86	0.42	2.87	3.00

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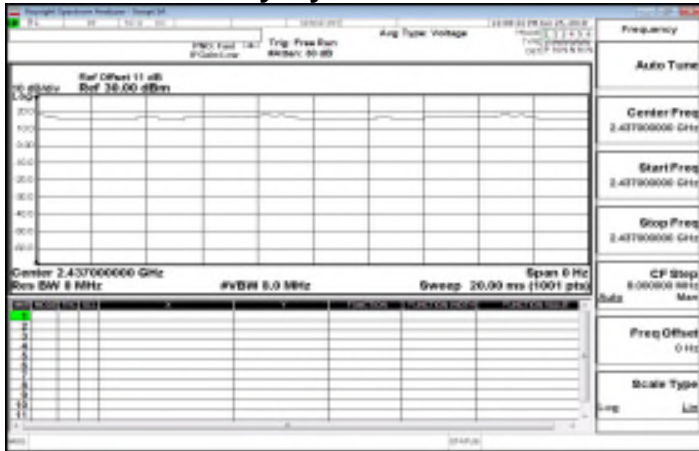
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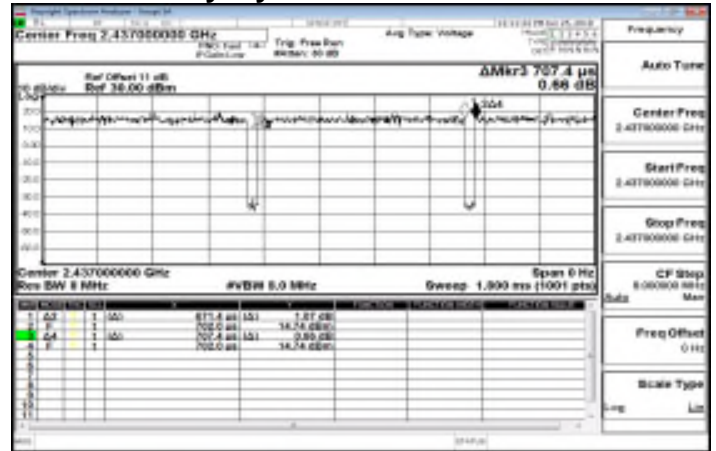


## 7.1 DUTY CYCLE TEST SIGNAL Measurement Result

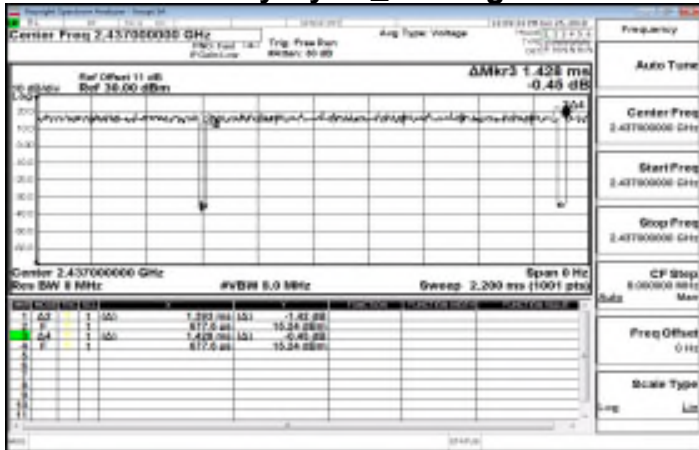
### Duty Cycle\_802.11b



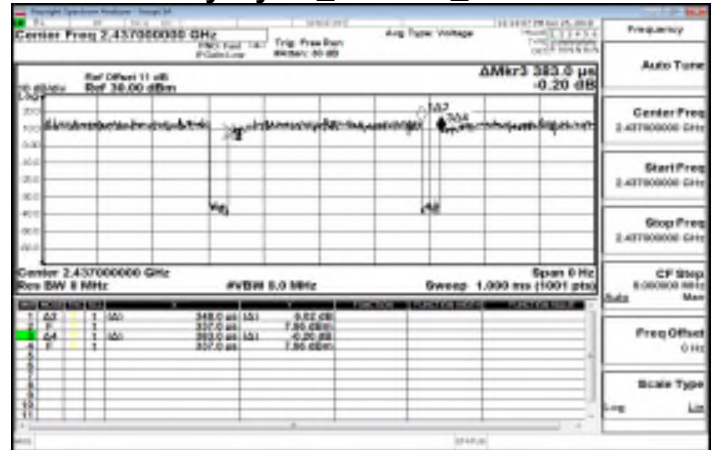
### Duty Cycle\_802.11n\_20MHz



### Duty Cycle\_802.11g



### Duty Cycle\_802.11n\_40MHz



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## 8 PEAK OUTPUT POWER MEASUREMENT

### 8.1 Standard Applicable

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

#### Note:

As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi.

(i) If transmit signals are correlated, then Directional gain  
 $= 10 \log[(10G1/20 + 10G2/20 + \dots + 10GN/20)^2 / NANT]$  dBi

[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Frequency (MHz)	Effective Legacy Gain (dBi)	Conducted Power Limit (dBm)
2412~2462	6.08	29.91970004

### 8.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1804001	2018/02/01	2019/01/31
Power Sensor	Anritsu	MA2411B	1726104	2018/02/01	2019/01/31
Power Sensor	Anritsu	MA2411B	1726107	2018/02/01	2019/01/31
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25
DC Power Supply	Agilent	E3640A	MY53130054	2017/09/04	2018/09/03
DC Power Supply	Agilent	E3640A	MY53130054	2018/09/02	2019/09/01
Notebook	Lenovo	T420	S0012599	N/A	N/A

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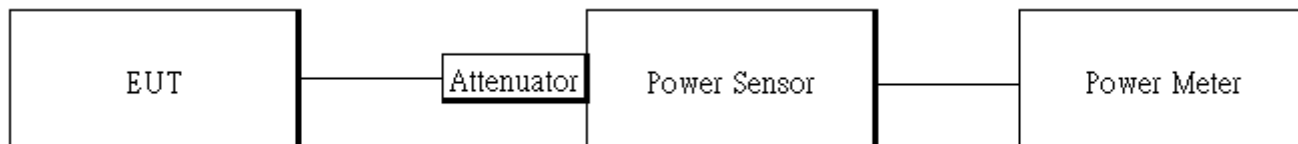
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### 8.3 Test Set-up

Power Meter:



### 8.4 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

#### Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Spectrum or Power Meter.

### 8.5 Measurement Result

802.11b Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	1	22.04	1 Watt = 30.00 dBm	PASS
6	2437	1	22.63	1 Watt = 30.00 dBm	PASS
11	2462	1	22.85	1 Watt = 30.00 dBm	PASS
802.11b Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	1	20.19	1 Watt = 30.00 dBm	PASS
6	2437	1	20.84	1 Watt = 30.00 dBm	PASS
11	2462	1	20.81	1 Watt = 30.00 dBm	PASS

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802.11b Aux1					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	1	21.97	1 Watt = 30.00 dBm	PASS
6	2437	1	22.50	1 Watt = 30.00 dBm	PASS
11	2462	1	22.73	1 Watt = 30.00 dBm	PASS
802.11b Aux1					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	1	20.13	1 Watt = 30.00 dBm	PASS
6	2437	1	20.73	1 Watt = 30.00 dBm	PASS
11	2462	1	20.69	1 Watt = 30.00 dBm	PASS

802.11b_2TX									
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit		RESULT
			CH 0	CH 1					
1	2412	1	19.36	18.88	22.14	163.57	1 Watt =	29.92 dBm	PASS
6	2437	1	19.99	19.55	22.79	189.93	1 Watt =	29.92 dBm	PASS
11	2462	1	20.09	19.83	22.97	198.26	1 Watt =	29.92 dBm	PASS
802.11b_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Max. Avg. Output include tune up tolerance Power (mW)	Limit		RESULT
			CH 0	CH 1					
1	2412	1	17.47	17.13	20.31	107.49	1 Watt =	29.92 dBm	PASS
6	2437	1	18.08	17.74	20.92	123.70	1 Watt =	29.92 dBm	PASS
11	2462	1	18.05	17.85	20.96	124.78	1 Watt =	29.92 dBm	PASS

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802.11g Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	6	27.73	1 Watt = 30.00 dBm	PASS
2	2417	6	27.35	1 Watt = 30.00 dBm	PASS
6	2437	6	28.65	1 Watt = 30.00 dBm	PASS
10	2457	6	27.33	1 Watt = 30.00 dBm	PASS
11	2462	6	27.56	1 Watt = 30.00 dBm	PASS
802.11g Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	6	19.94	1 Watt = 30.00 dBm	PASS
2	2417	6	21.37	1 Watt = 30.00 dBm	PASS
6	2437	6	23.37	1 Watt = 30.00 dBm	PASS
10	2457	6	21.19	1 Watt = 30.00 dBm	PASS
11	2462	6	18.33	1 Watt = 30.00 dBm	PASS
802.11g Aux1					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	6	27.65	1 Watt = 30.00 dBm	PASS
2	2417	6	27.23	1 Watt = 30.00 dBm	PASS
6	2437	6	28.59	1 Watt = 30.00 dBm	PASS
10	2457	6	27.26	1 Watt = 30.00 dBm	PASS
11	2462	6	27.48	1 Watt = 30.00 dBm	PASS
802.11g Aux1					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	6	19.84	1 Watt = 30.00 dBm	PASS
2	2417	6	21.27	1 Watt = 30.00 dBm	PASS
6	2437	6	23.32	1 Watt = 30.00 dBm	PASS
10	2457	6	21.13	1 Watt = 30.00 dBm	PASS
11	2462	6	18.24	1 Watt = 30.00 dBm	PASS

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802.11g_2TX									
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit		RESULT
			CH 0	CH 1					
1	2412	6	25.02	24.98	28.01	632.46	1 Watt =	29.92 dBm	PASS
2	2417	6	24.67	24.66	27.68	585.50	1 Watt =	29.92 dBm	PASS
6	2437	6	25.79	25.63	<b>28.72</b>	744.91	1 Watt =	29.92 dBm	PASS
10	2457	6	24.47	24.35	27.42	552.17	1 Watt =	29.92 dBm	PASS
11	2462	6	24.82	24.73	27.79	600.56	1 Watt =	29.92 dBm	PASS
802.11g_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Max. Avg. Output include tune up tolerance Power (mW)	Limit		RESULT
			CH 0	CH 1					
1	2412	6	17.14	16.74	20.06	101.47	1 Watt =	29.92 dBm	PASS
2	2417	6	18.55	18.05	21.43	138.87	1 Watt =	29.92 dBm	PASS
6	2437	6	20.64	20.45	<b>23.66</b>	232.54	1 Watt =	29.92 dBm	PASS
10	2457	6	18.29	18.06	21.30	134.75	1 Watt =	29.92 dBm	PASS
11	2462	6	15.46	15.21	18.46	70.08	1 Watt =	29.92 dBm	PASS

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802.11n_HT20M Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	MCS0	24.47	1 Watt = 30.00 dBm	PASS
2	2417	MCS0	<b>28.86</b>	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	28.51	1 Watt = 30.00 dBm	PASS
10	2457	MCS0	28.59	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	24.19	1 Watt = 30.00 dBm	PASS
802.11n_HT20M Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	MCS0	17.44	1 Watt = 30.00 dBm	PASS
2	2417	MCS0	22.38	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	23.66	1 Watt = 30.00 dBm	PASS
10	2457	MCS0	<b>23.73</b>	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	17.85	1 Watt = 30.00 dBm	PASS
802.11n_HT20M Aux1					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
1	2412	MCS0	24.36	1 Watt = 30.00 dBm	PASS
2	2417	MCS0	28.74	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	28.44	1 Watt = 30.00 dBm	PASS
10	2457	MCS0	28.51	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	24.13	1 Watt = 30.00 dBm	PASS
802.11n_HT20M Aux1					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
1	2412	MCS0	17.37	1 Watt = 30.00 dBm	PASS
2	2417	MCS0	22.27	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	23.60	1 Watt = 30.00 dBm	PASS
10	2457	MCS0	23.65	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	17.77	1 Watt = 30.00 dBm	PASS

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## 802.11n\_HT20M MIMO

CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CH 0	CH 1				
1	2412	MCS8	21.65	21.57	24.62	289.77	1 Watt = 29.92 dBm	PASS
2	2417	MCS8	25.99	25.92	<b>28.97</b>	788.03	1 Watt = 29.92 dBm	PASS
6	2437	MCS8	25.69	25.59	28.65	732.92	1 Watt = 29.92 dBm	PASS
10	2457	MCS8	25.70	25.61	28.67	735.45	1 Watt = 29.92 dBm	PASS
11	2462	MCS8	21.29	21.15	24.23	264.90	1 Watt = 29.92 dBm	PASS

## 802.11n\_HT20M MIMO

CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Max. Avg. Output include tune up tolerance Power (mW)	Limit	RESULT
			CH 0	CH 1				
1	2412	MCS8	14.36	14.19	17.51	56.40	1 Watt = 29.92 dBm	PASS
2	2417	MCS8	19.51	19.04	22.52	178.59	1 Watt = 29.92 dBm	PASS
6	2437	MCS8	20.93	20.57	23.99	250.66	1 Watt = 29.92 dBm	PASS
10	2457	MCS8	20.84	20.75	<b>24.03</b>	253.07	1 Watt = 29.92 dBm	PASS
11	2462	MCS8	14.87	14.51	17.93	62.10	1 Watt = 29.92 dBm	PASS

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802.11n_HT40M Main					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
3	2422	MCS0	22.94	1 Watt = 30.00 dBm	PASS
4	2427	MCS0	24.17	1 Watt = 30.00 dBm	PASS
5	2432	MCS0	24.98	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	<b>28.46</b>	1 Watt = 30.00 dBm	PASS
7	2442	MCS0	25.13	1 Watt = 30.00 dBm	PASS
8	2447	MCS0	24.19	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	24.37	1 Watt = 30.00 dBm	PASS
802.11n_HT40M Main					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
3	2422	MCS0	14.93	1 Watt = 30.00 dBm	PASS
4	2427	MCS0	16.67	1 Watt = 30.00 dBm	PASS
5	2432	MCS0	18.15	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	<b>23.84</b>	1 Watt = 30.00 dBm	PASS
7	2442	MCS0	18.64	1 Watt = 30.00 dBm	PASS
8	2447	MCS0	16.67	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	16.86	1 Watt = 30.00 dBm	PASS

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802.11n_HT40M Aux1					
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit	RESULT
3	2422	MCS0	22.85	1 Watt = 30.00 dBm	PASS
4	2427	MCS0	24.13	1 Watt = 30.00 dBm	PASS
5	2432	MCS0	24.91	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	28.34	1 Watt = 30.00 dBm	PASS
7	2442	MCS0	25.01	1 Watt = 30.00 dBm	PASS
8	2447	MCS0	24.12	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	24.28	1 Watt = 30.00 dBm	PASS
802.11n_HT40M Aux1					
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Limit	RESULT
3	2422	MCS0	14.85	1 Watt = 30.00 dBm	PASS
4	2427	MCS0	16.61	1 Watt = 30.00 dBm	PASS
5	2432	MCS0	18.09	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	23.76	1 Watt = 30.00 dBm	PASS
7	2442	MCS0	18.59	1 Watt = 30.00 dBm	PASS
8	2447	MCS0	16.63	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	16.70	1 Watt = 30.00 dBm	PASS

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802.11n_HT40M MIMO									
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit		RESULT
			CH 0	CH 1					
3	2422	MCS8	20.11	20.01	23.07	202.80	1 Watt =	29.92 dBm	PASS
4	2427	MCS8	21.24	21.15	24.21	263.36	1 Watt =	29.92 dBm	PASS
5	2432	MCS8	22.07	22.01	25.05	319.92	1 Watt =	29.92 dBm	PASS
6	2437	MCS8	25.65	25.44	<b>28.56</b>	717.23	1 Watt =	29.92 dBm	PASS
7	2442	MCS8	22.28	22.21	25.26	335.39	1 Watt =	29.92 dBm	PASS
8	2447	MCS8	21.27	21.22	24.26	266.40	1 Watt =	29.92 dBm	PASS
9	2452	MCS8	21.48	21.40	24.45	278.64	1 Watt =	29.92 dBm	PASS
802.11n_HT40M MIMO									
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Max. Avg. Output include tune up tolerance Power (mW)	Limit		RESULT
			CH 0	CH 1					
3	2422	MCS8	11.65	11.60	15.05	32.00	1 Watt =	29.92 dBm	PASS
4	2427	MCS8	13.42	13.32	16.80	47.83	1 Watt =	29.92 dBm	PASS
5	2432	MCS8	14.95	14.87	18.34	68.18	1 Watt =	29.92 dBm	PASS
6	2437	MCS8	20.64	20.55	<b>24.02</b>	252.45	1 Watt =	29.92 dBm	PASS
7	2442	MCS8	15.41	15.34	18.80	75.89	1 Watt =	29.92 dBm	PASS
8	2447	MCS8	13.42	13.37	16.82	48.10	1 Watt =	29.92 dBm	PASS
9	2452	MCS8	13.61	13.44	16.95	49.57	1 Watt =	29.92 dBm	PASS

**\* Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.**

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## 9 6DB & 99% BANDWIDTH MEASUREMENT

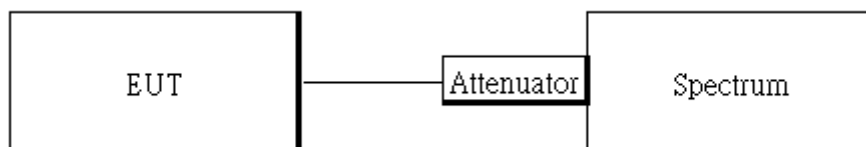
### 9.1 Standard Applicable

The minimum 6 dB bandwidth shall be at least 500 kHz.

### 9.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	N9010A	MY51440113	2018/06/20	2019/06/19
DC Power Supply	Agilent	E3640A	MY53130054	2017/09/04	2018/09/03
DC Block	PASTERNAK	PE8210	RF29	2017/12/26	2018/12/25
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017

### 9.3 Test Set-up



### 9.4 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. For 6dB Bandwidth:  
Set the spectrum analyzer as RBW = 100 kHz, VBW = 3\*RBW, Span = 30M/50MHz, Detector=peak, Sweep=auto.
5. Mark the peak frequency and -6dB (upper and lower) frequency.
6. For 99% Bandwidth:  
Set the spectrum analyzer as RBW=1%, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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## 9.5 Measurement Result

### 802.11b Main

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	9072.00	> 500	PASS
2437	<b>9102.00</b>	> 500	PASS
2462	8586.00	> 500	PASS

### 802.11b Aux1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	9096.00	> 500	PASS
2437	9097.00	> 500	PASS
2462	<b>9569.00</b>	> 500	PASS

### 802.11g Main

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15140.00	> 500	PASS
2417	15070.00	> 500	PASS
2437	<b>15150.00</b>	> 500	PASS
2457	15130.00	> 500	PASS
2462	<b>15150.00</b>	> 500	PASS

### 802.11g Aux1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15140.00	> 500	PASS
2417	15060.00	> 500	PASS
2437	<b>15150.00</b>	> 500	PASS
2457	14400.00	> 500	PASS
2462	15140.00	> 500	PASS

### 802.11\_n HT20 Main

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15150.00	> 500	PASS
2417	<b>15170.00</b>	> 500	PASS
2437	15150.00	> 500	PASS
2457	15110.00	> 500	PASS
2462	15150.00	> 500	PASS

### 802.11\_n HT20 Aux1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15150.00	> 500	PASS
2417	<b>15170.00</b>	> 500	PASS
2437	15150.00	> 500	PASS
2457	15110.00	> 500	PASS
2462	15150.00	> 500	PASS

### 802.11\_n HT40 Main

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	<b>35170.00</b>	> 500	PASS
2427	<b>35170.00</b>	> 500	PASS
2432	35160.00	> 500	PASS
2437	35150.00	> 500	PASS
2442	35020.00	> 500	PASS
2447	35160.00	> 500	PASS
2452	<b>35170.00</b>	> 500	PASS

### 802.11\_n HT40 Aux1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	<b>35160.00</b>	> 500	PASS
2427	<b>35160.00</b>	> 500	PASS
2432	35150.00	> 500	PASS
2437	35110.00	> 500	PASS
2442	35150.00	> 500	PASS
2447	35150.00	> 500	PASS
2452	<b>35160.00</b>	> 500	PASS

\*Refer to next page for plots

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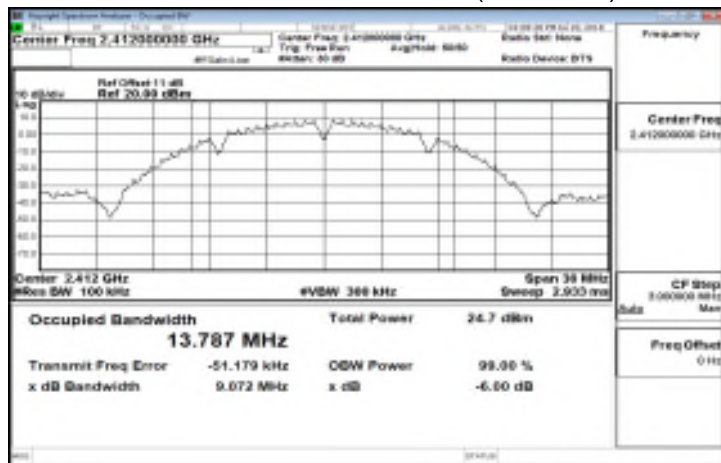
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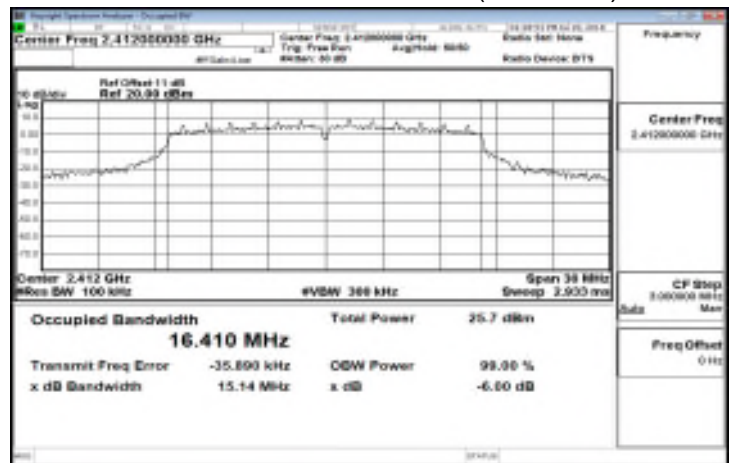
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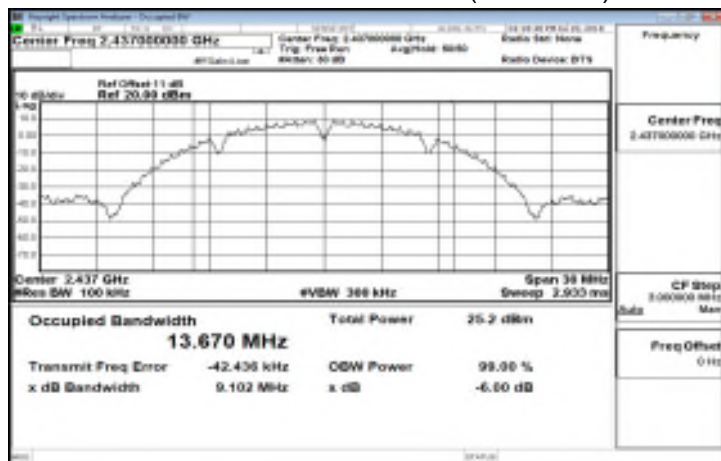
802.11b (Main)  
6dB Band Width Test Data CH-Low (2412MHz)



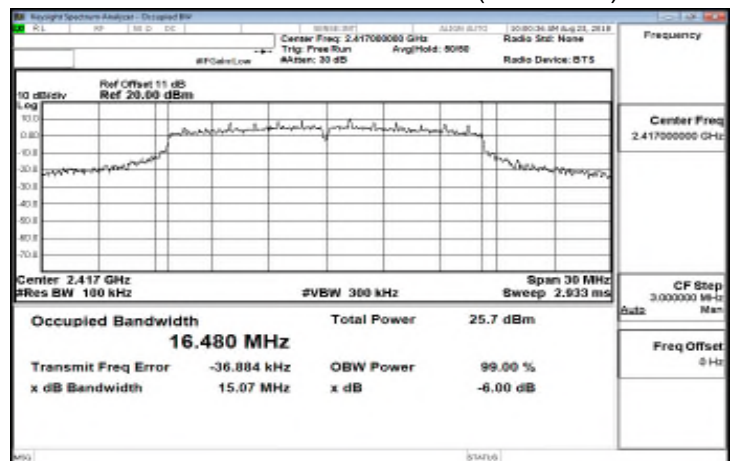
802.11g (Main)  
6dB Band Width Test Data CH-Low (2412MHz)



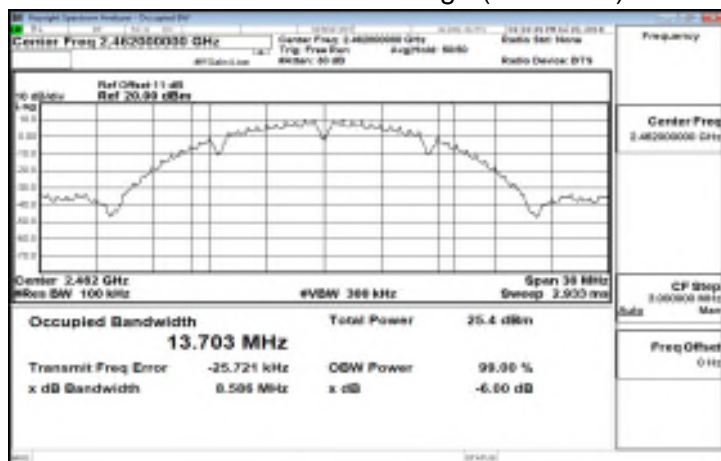
6dB Band Width Test Data CH-Mid (2437MHz)



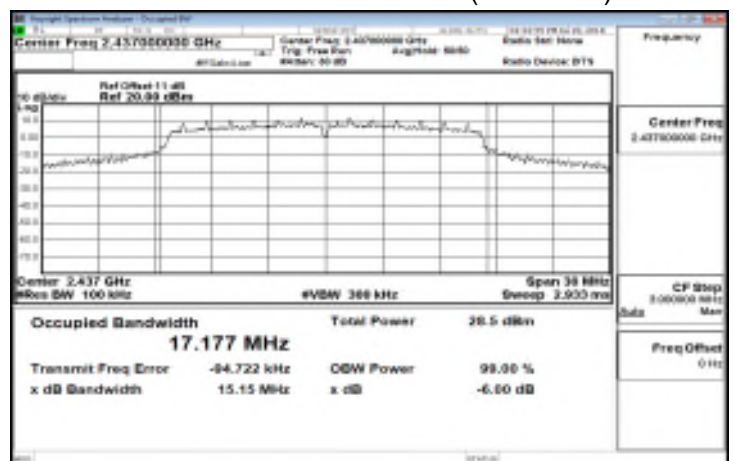
6dB Band Width Test Data CH-Low (2417MHz)



6dB Band Width Test Data CH-High (2462MHz)



6dB Band Width Test Data CH-Mid (2437MHz)



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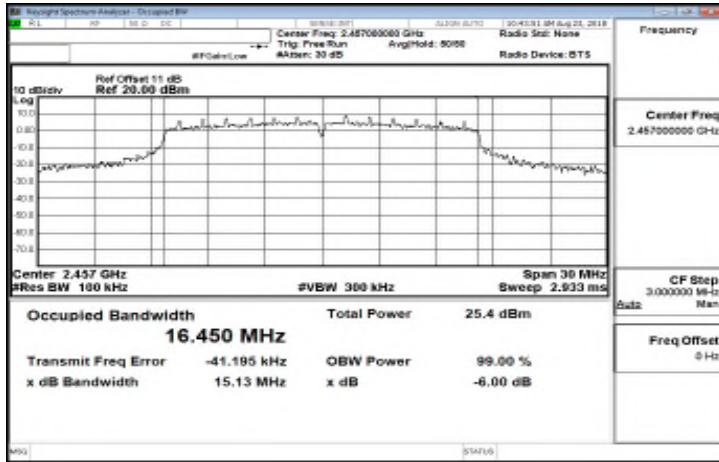
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## 6dB Band Width Test Data CH-High (2457MHz)

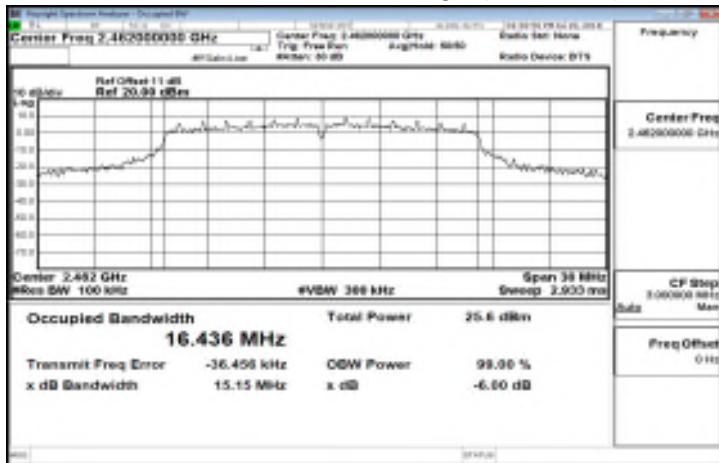


## 802.11n\_20M (Main)

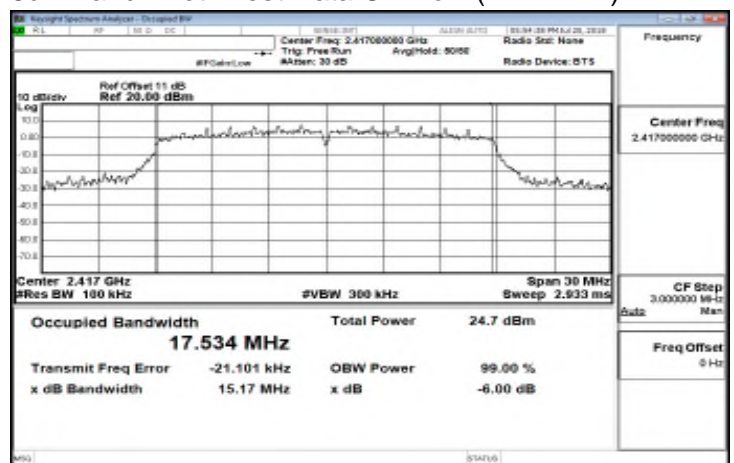
## 6dB Band Width Test Data CH-Low (2412MHz)



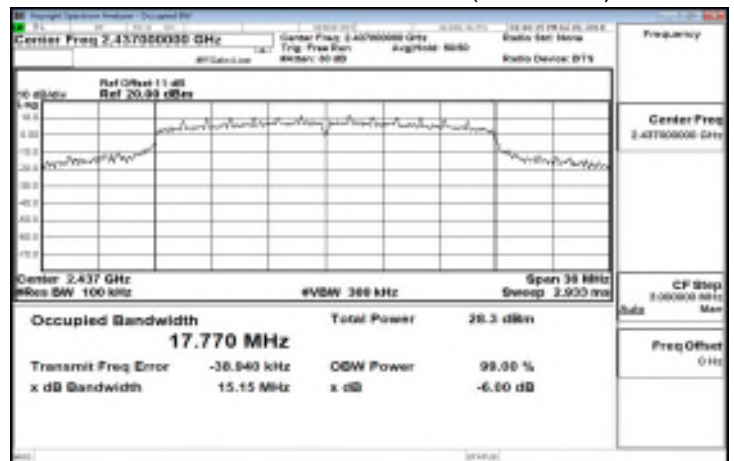
## 6dB Band Width Test Data CH-High (2462MHz)



## 6dB Band Width Test Data CH-Low (2417MHz)



## 6dB Band Width Test Data CH-Mid (2437MHz)



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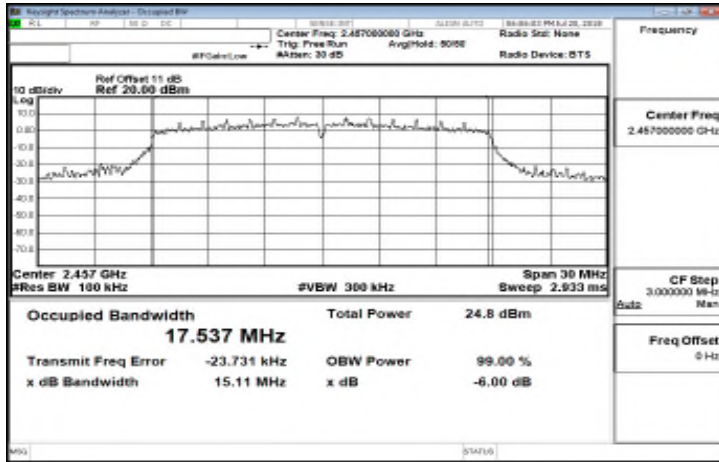
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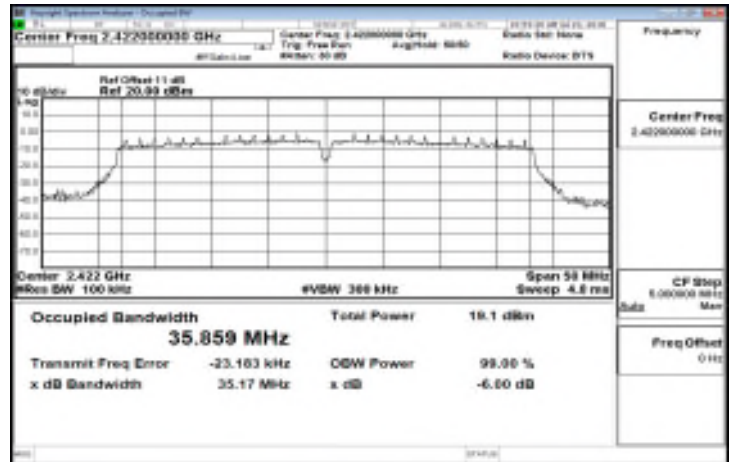
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6dB Band Width Test Data CH-High (2457MHz)

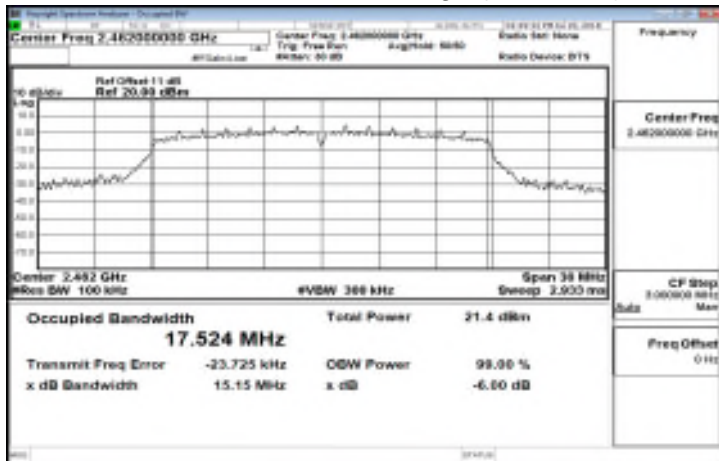


802.11n\_40M (Main)

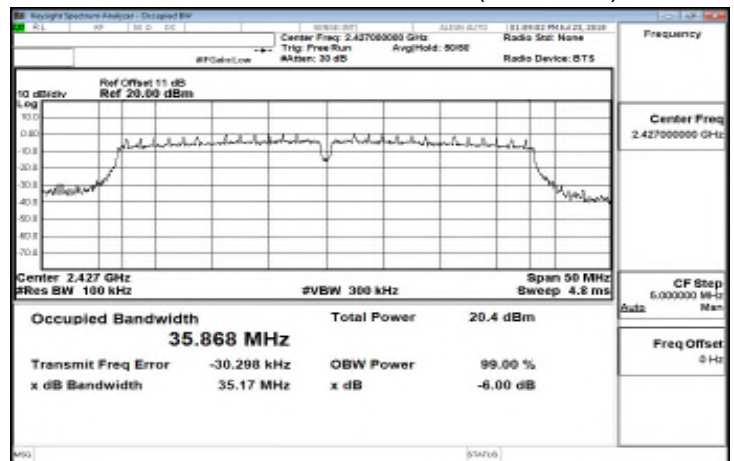
6dB Band Width Test Data CH-Low (2422MHz)



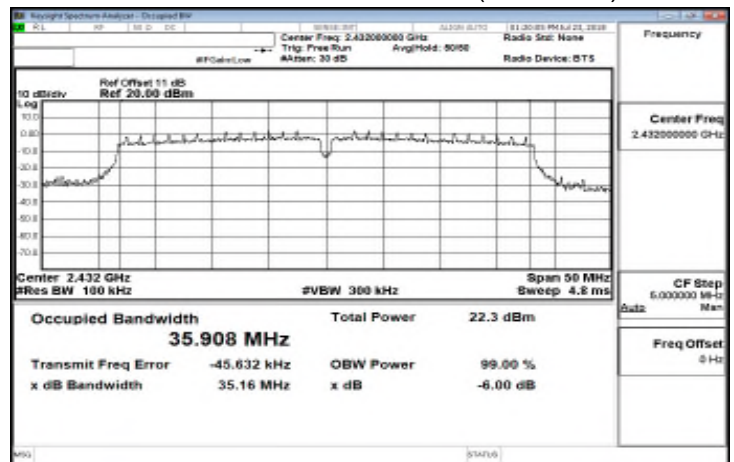
6dB Band Width Test Data CH-High (2462MHz)



6dB Band Width Test Data CH-Low (2427MHz)



6dB Band Width Test Data CH-Low (2432MHz)



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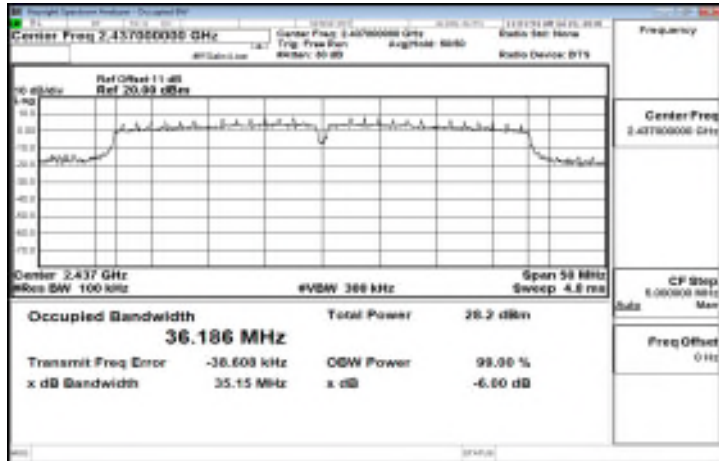
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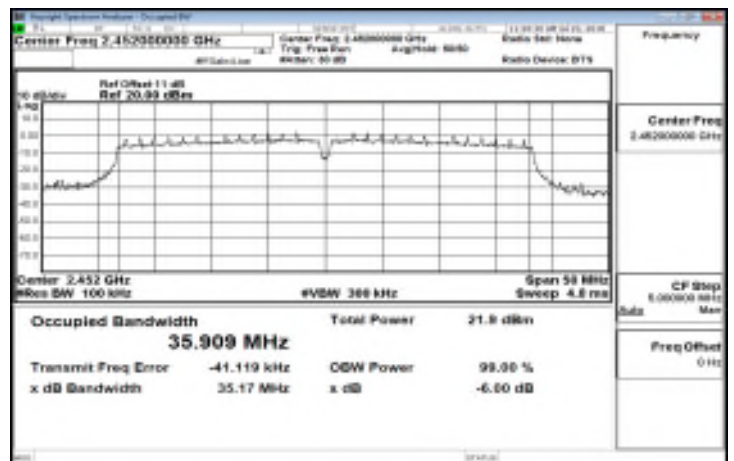
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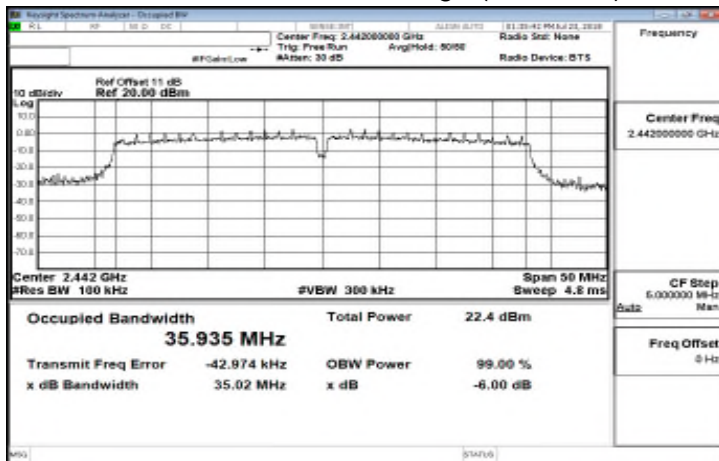
6dB Band Width Test Data CH-Mid (2437MHz)



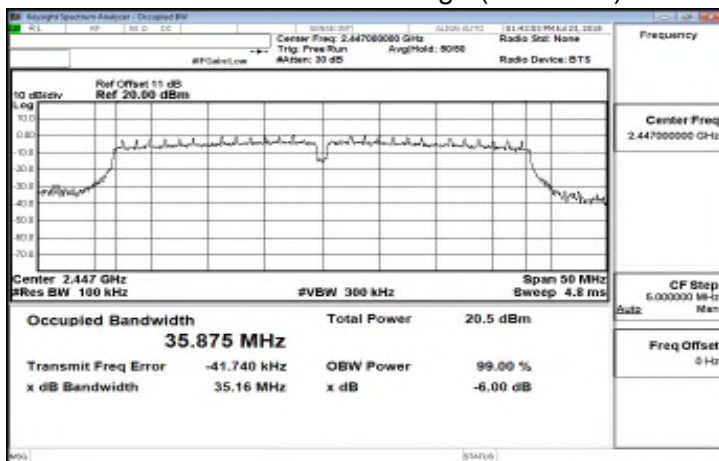
6dB Band Width Test Data CH-High (2452MHz)



6dB Band Width Test Data CH-High (2442MHz)



6dB Band Width Test Data CH-High (2447MHz)



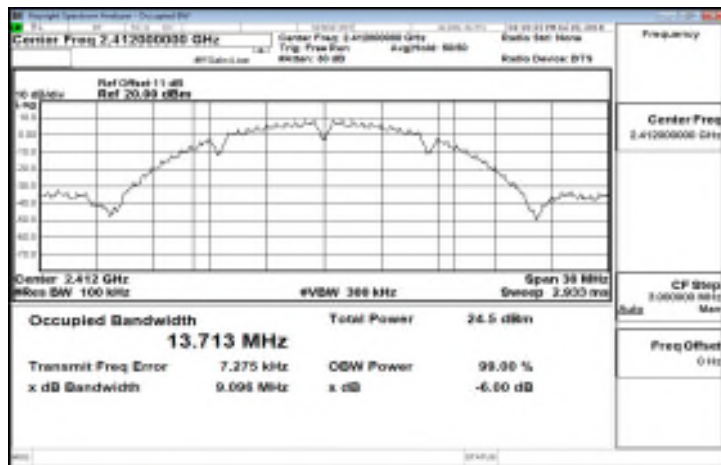
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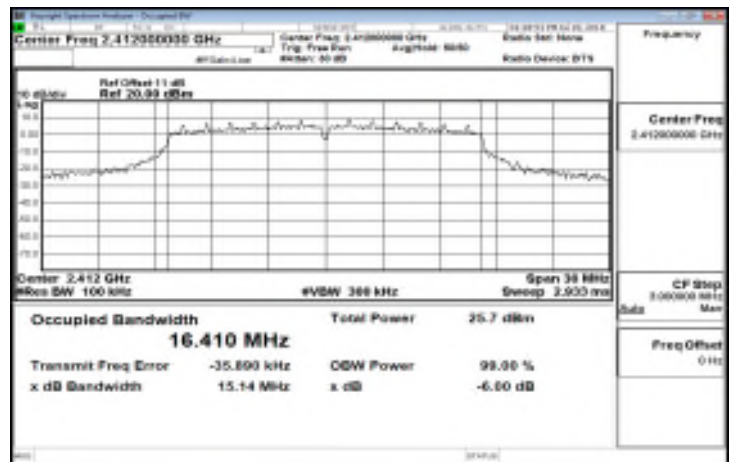
## 802.11b (Aux)

### 6dB Band Width Test Data CH-Low (2412MHz)

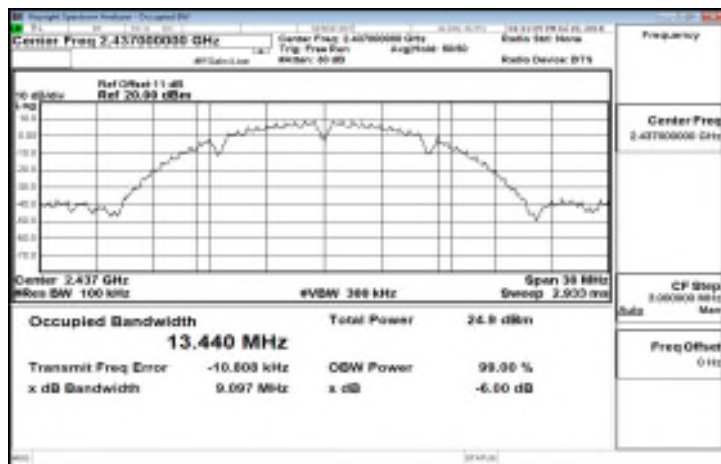


## 802.11g (Aux)

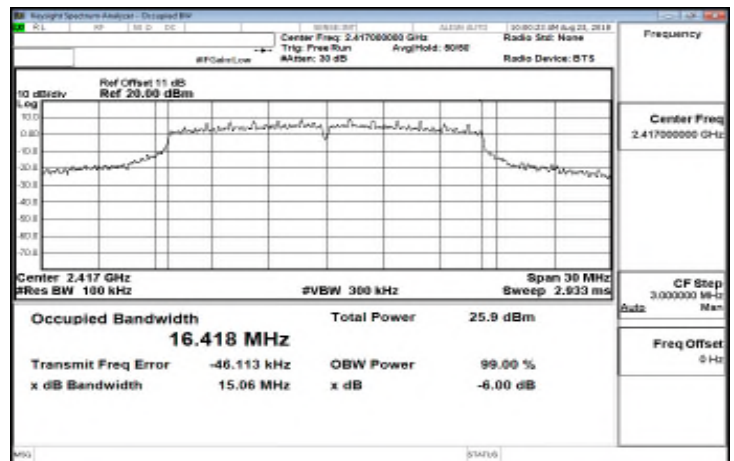
### 6dB Band Width Test Data CH-Low (2412MHz)



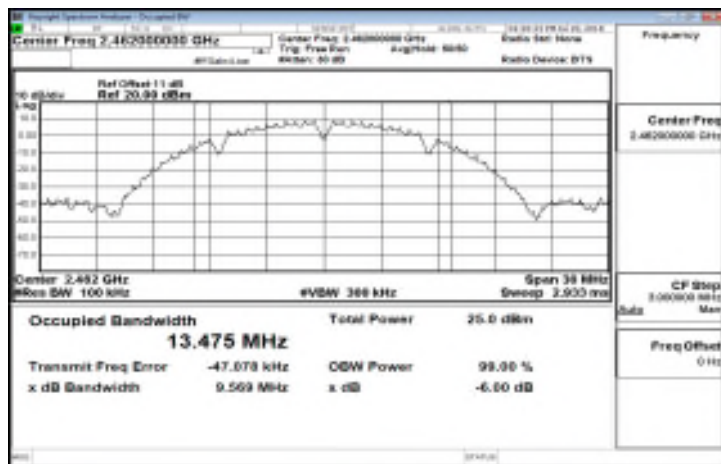
### 6dB Band Width Test Data CH-Mid (2437MHz)



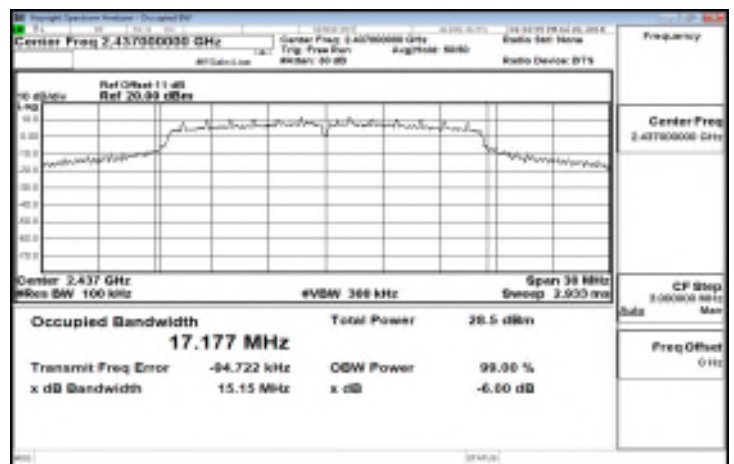
### 6dB Band Width Test Data CH-Low (2417MHz)



### 6dB Band Width Test Data CH-High (2462MHz)



### 6dB Band Width Test Data CH-Mid (2437MHz)



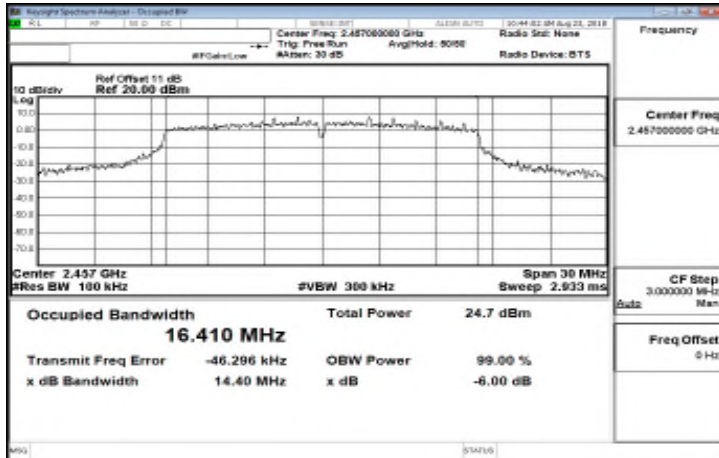
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802.11n\_20M (Aux)

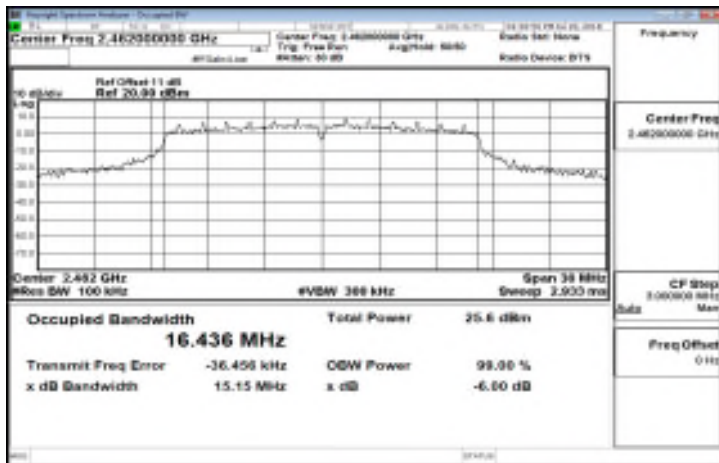
6dB Band Width Test Data CH-High (2457MHz)



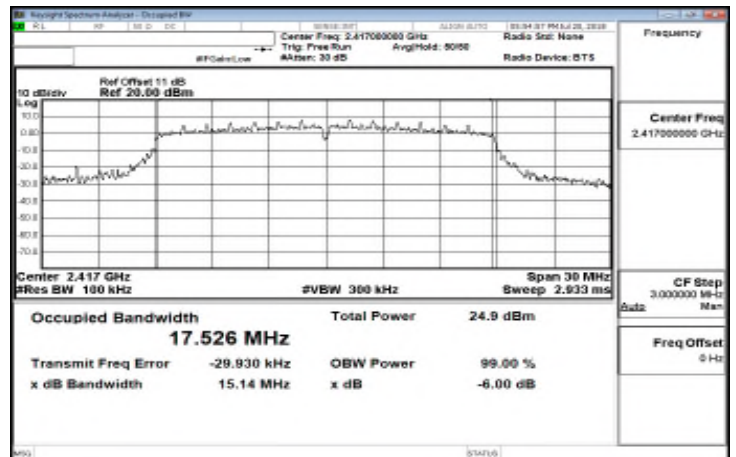
6dB Band Width Test Data CH-Low (2412MHz)



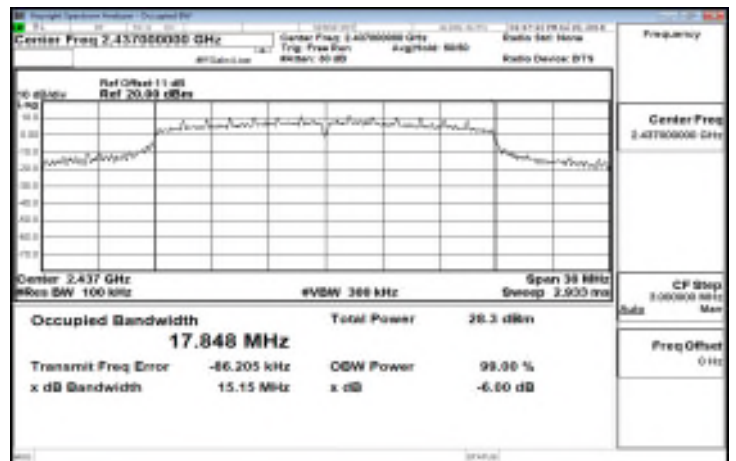
6dB Band Width Test Data CH-High (2462MHz)



6dB Band Width Test Data CH-Low (2417MHz)



6dB Band Width Test Data CH-Mid (2437MHz)



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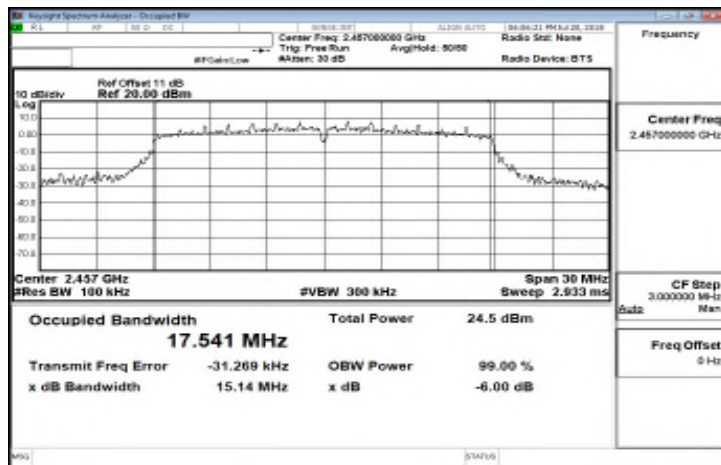
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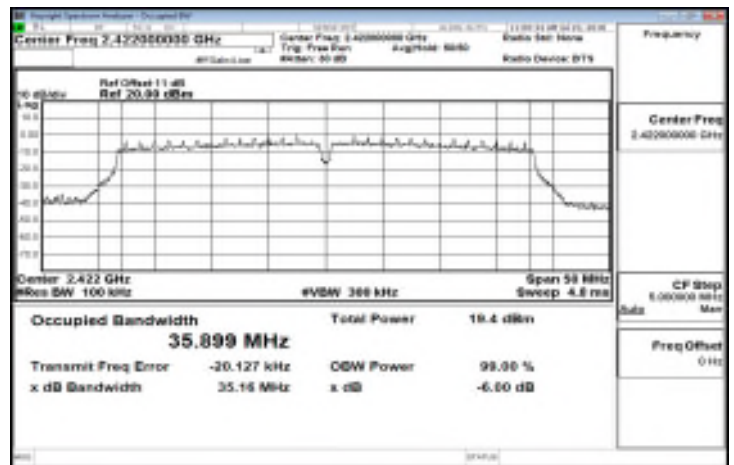


6dB Band Width Test Data CH-High (2457MHz)

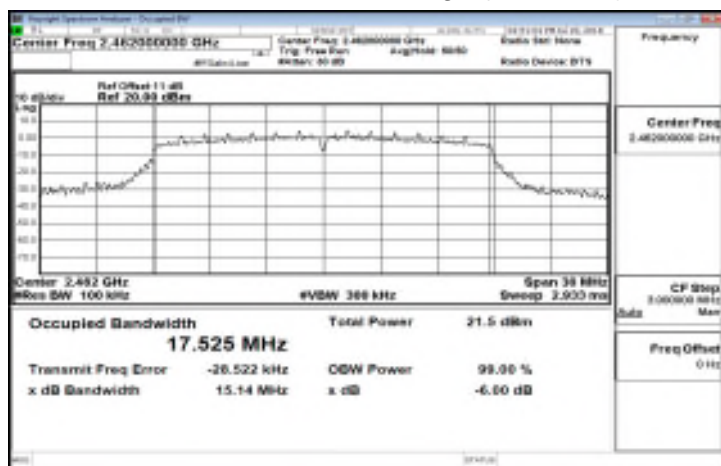


802.11n\_40M (Aux)

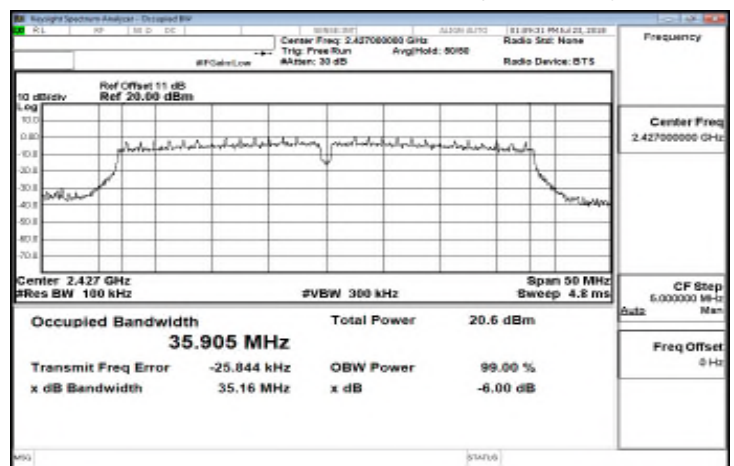
6dB Band Width Test Data CH-Low (2422MHz)



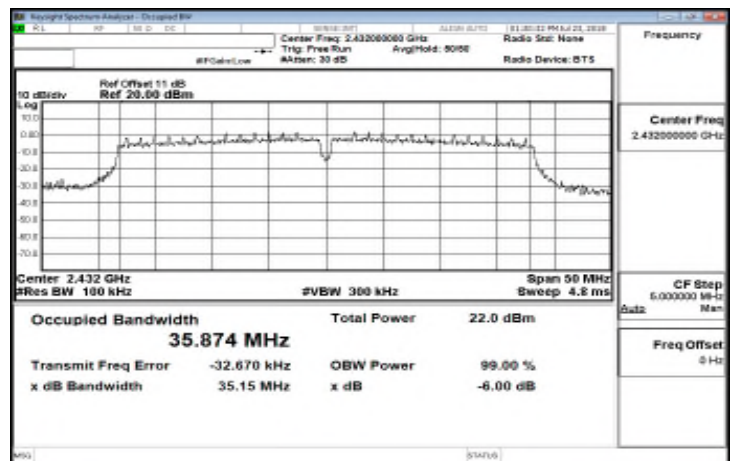
6dB Band Width Test Data CH-High (2462MHz)



6dB Band Width Test Data CH-Low (2427MHz)



6dB Band Width Test Data CH-Low (2432MHz)

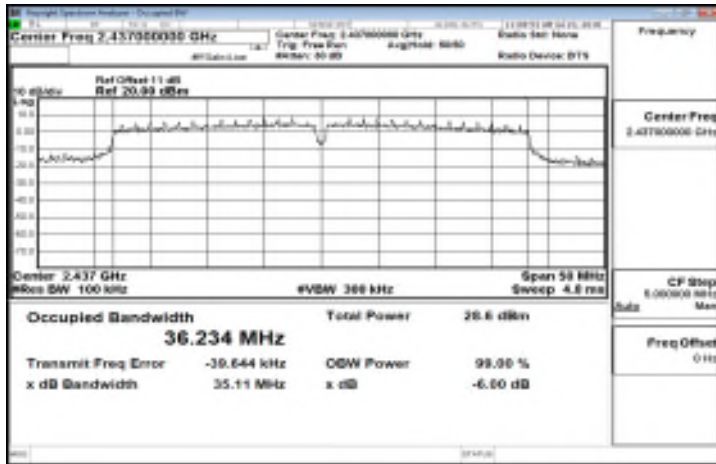


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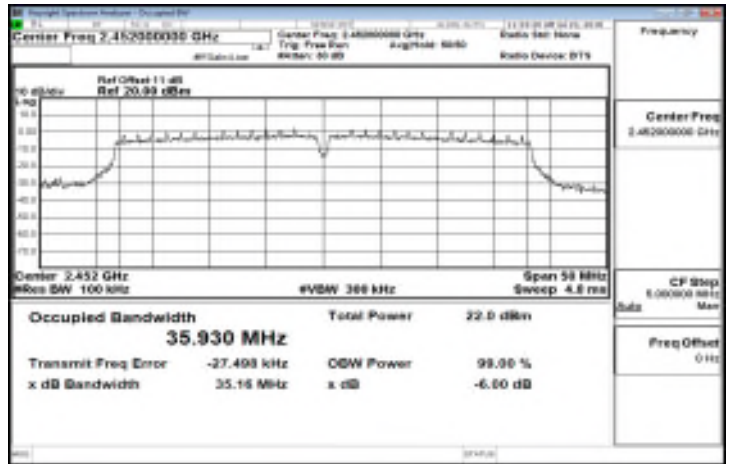
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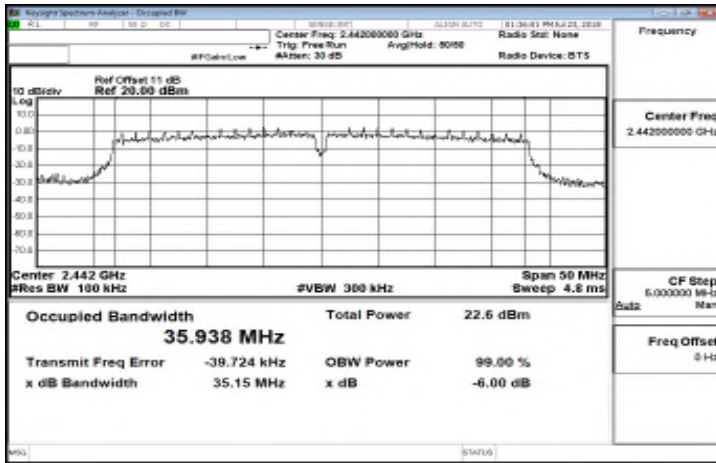
## 6dB Band Width Test Data CH-Mid (2437MHz)



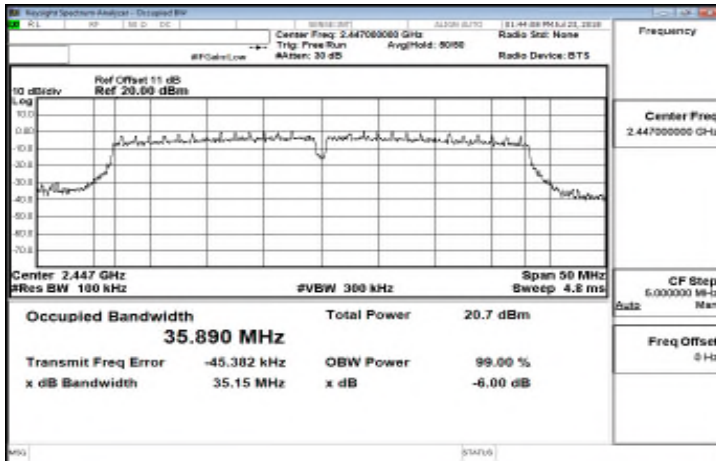
## 6dB Band Width Test Data CH-High (2452MHz)



## 6dB Band Width Test Data CH-High (2442MHz)



## 6dB Band Width Test Data CH-High (2447MHz)



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## 10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

### 10.1 Standard Applicable

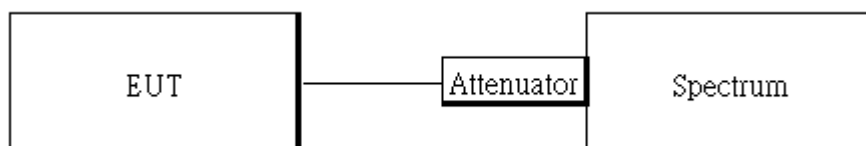
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

### 10.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	N9010A	MY51440113	2018/06/20	2019/06/19
DC Power Supply	Agilent	E3640A	MY53130054	2017/09/04	2018/09/03
DC Block	PASTERNAK	PE8210	RF29	2017/12/26	2018/12/25
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017

### 10.3 Test SET-UP



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## 10.4 Measurement Procedure

### Reference Level of Emission Calculation:

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 100kHz & VBW = 300 kHz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.  
Use the peak marker function to determine the maximum amplitude level.

### Conducted Band Edge:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
6. Mark the highest reading of the emission as the reference level measurement.
7. Set DL as the limit = reading on marker 1 – 20dBm
8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 kHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
9. Repeat above procedures until all default test channel (low, middle, and high) was complete.

### Conducted Spurious Emission:

1. To connect Antenna Port of EUT to Spectrum
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.

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## 10.5 Measurement Result

Reference Level of Limit 802.11b mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	10.95	-9.05
2437	11.49	-8.51
2462	11.73	-8.27

Reference Level of Limit 802.11g mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	11.68	-8.32
2417	12.23	-7.77
2437	13.59	-6.41
2457	11.81	-8.19
2462	11.16	-8.84

Reference Level of Limit 802.11n20 mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2412	7.92	-12.08
2417	13.88	-6.12
2437	13.62	-6.39
2457	13.52	-6.49
2462	7.40	-12.60

Reference Level of Limit 802.11n40 mode		
Freq. (MHz)	PSD (dBm)	Reference Level of Limit (dBm)
2422	1.6	-18.40
2427	3.09	-16.91
2432	4.671	-15.33
2437	10.483	-9.52
2442	5.328	-14.67
2447	3.374	-16.63
2452	4.45	-15.55

offset 11.00 dB for SISO mode  
offset 14.00 dB for MIMO mode

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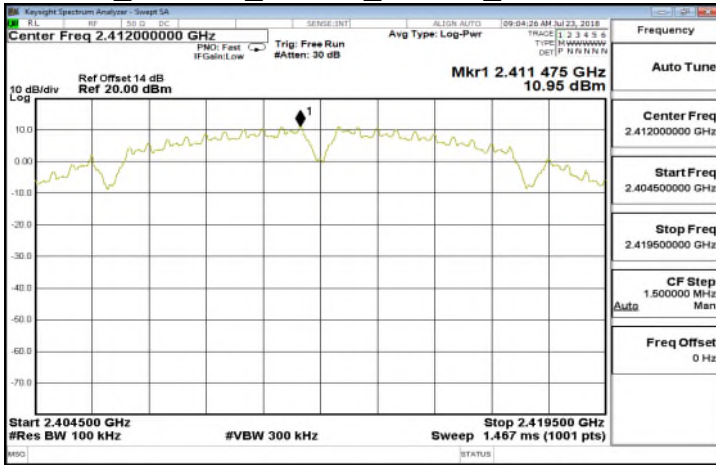
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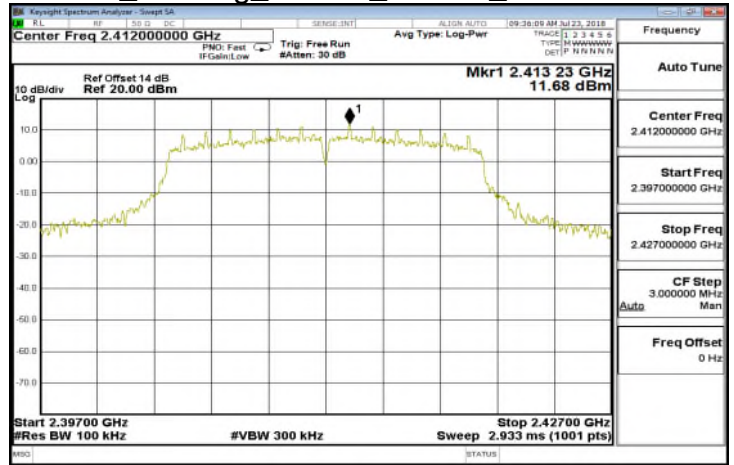
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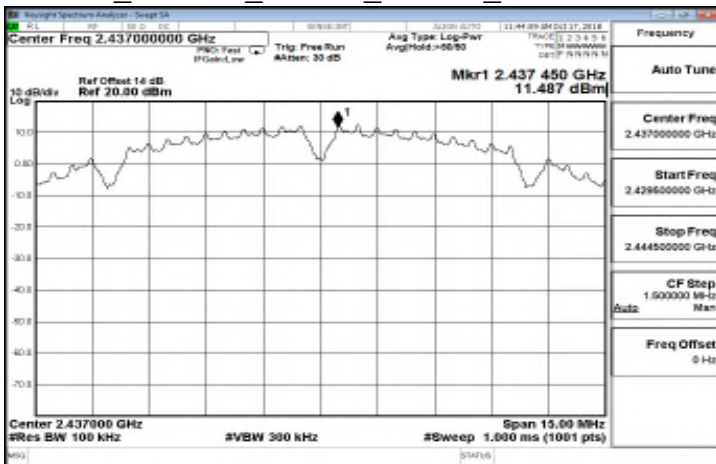
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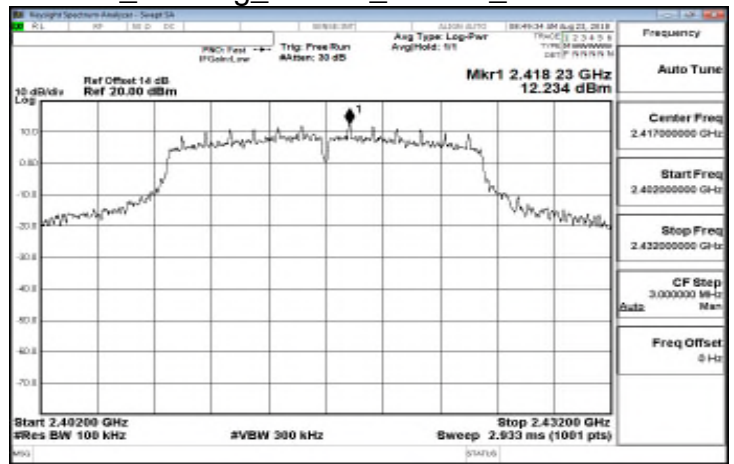
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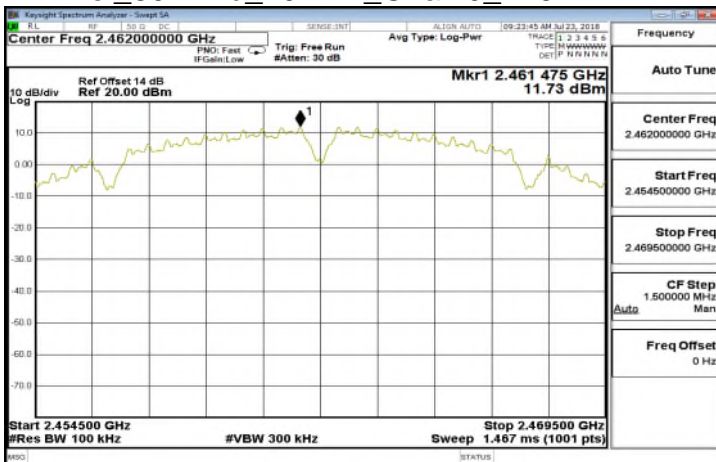
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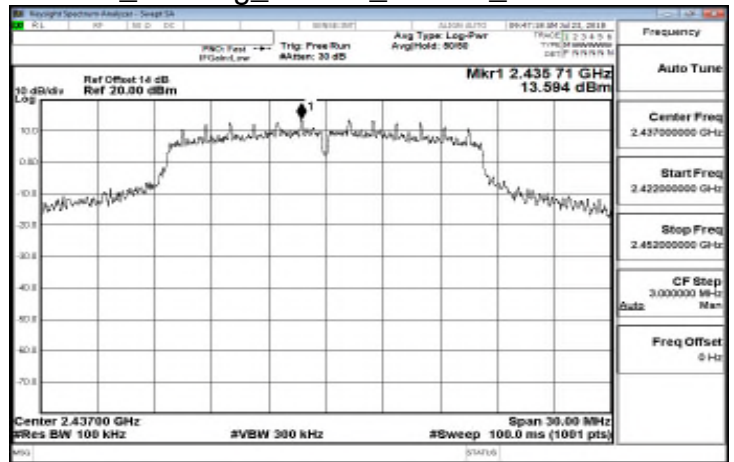
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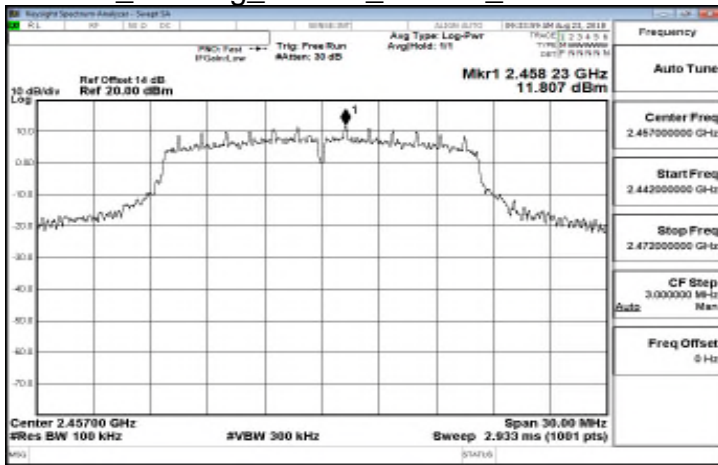


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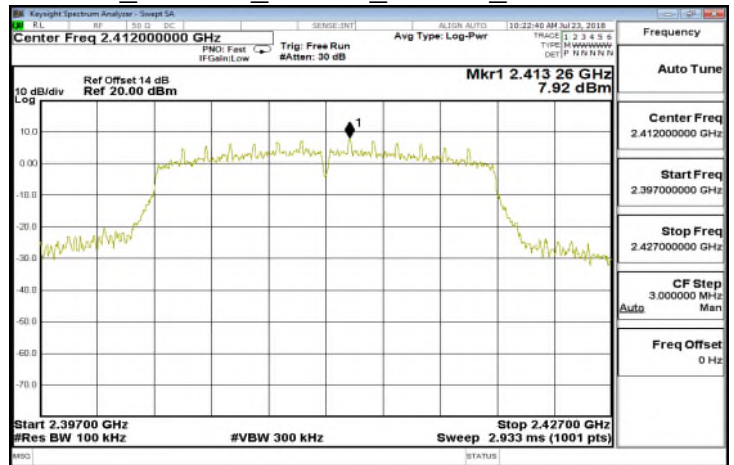
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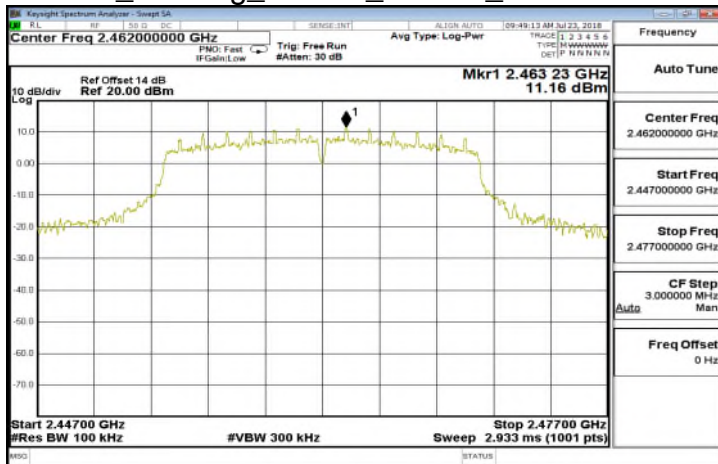
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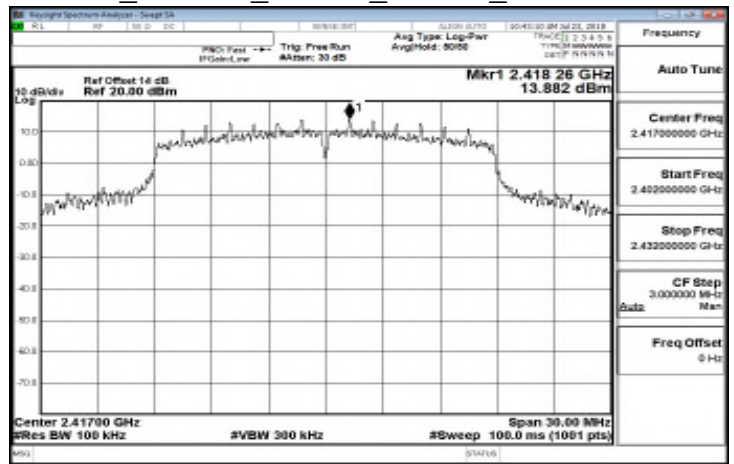
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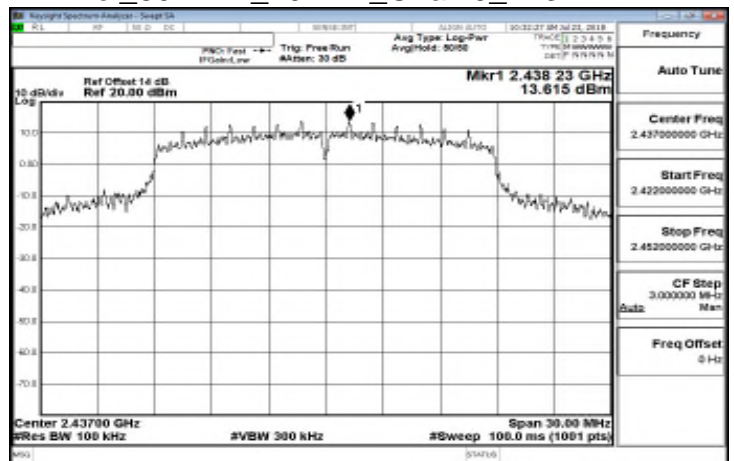
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Reference Lev-  
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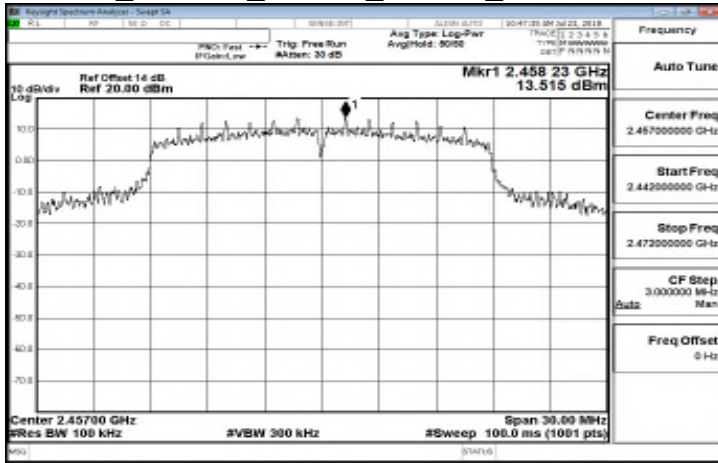
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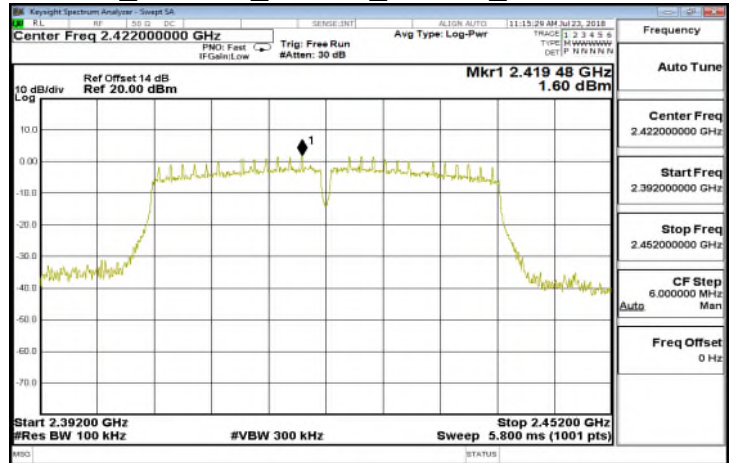
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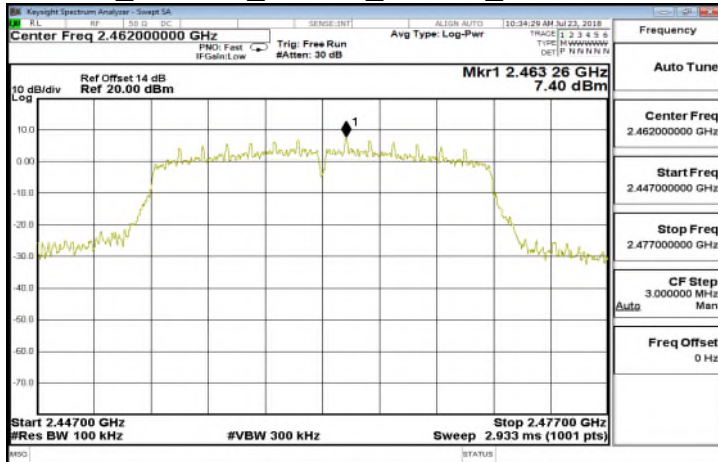
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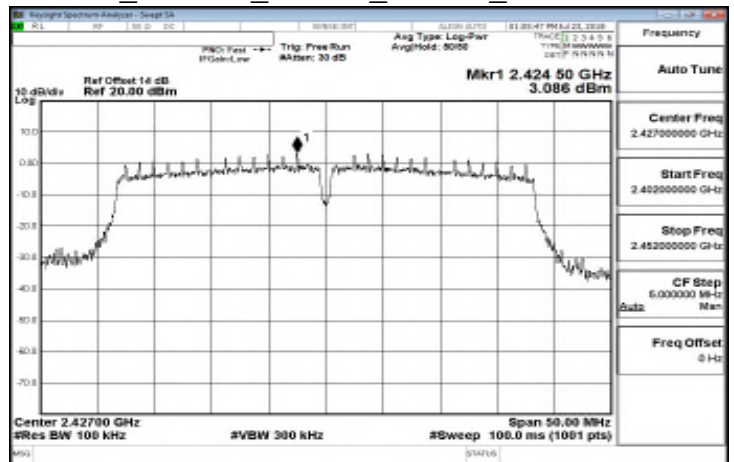
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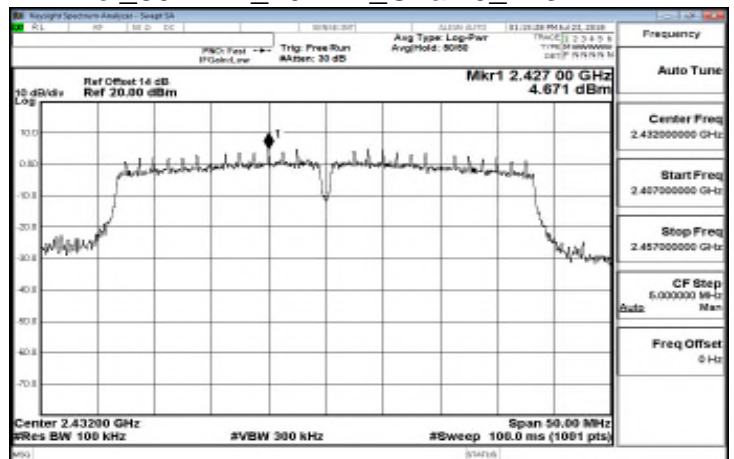
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Reference Lev-  
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Reference Lev-  
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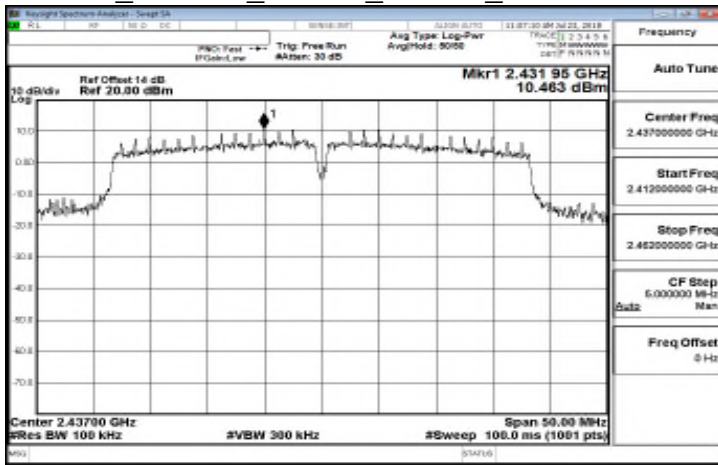
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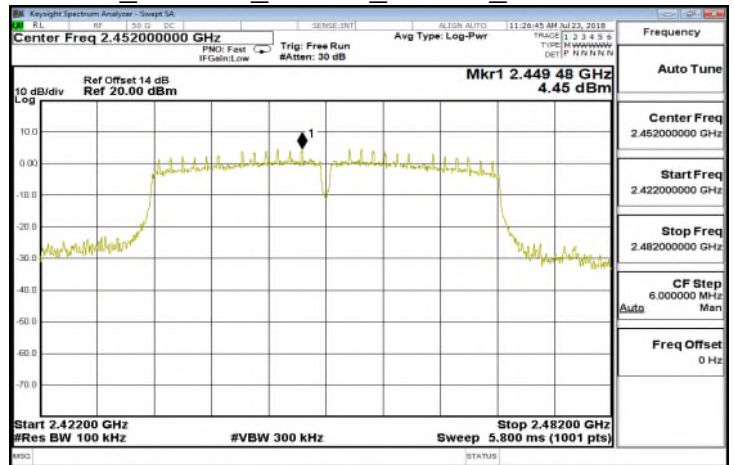
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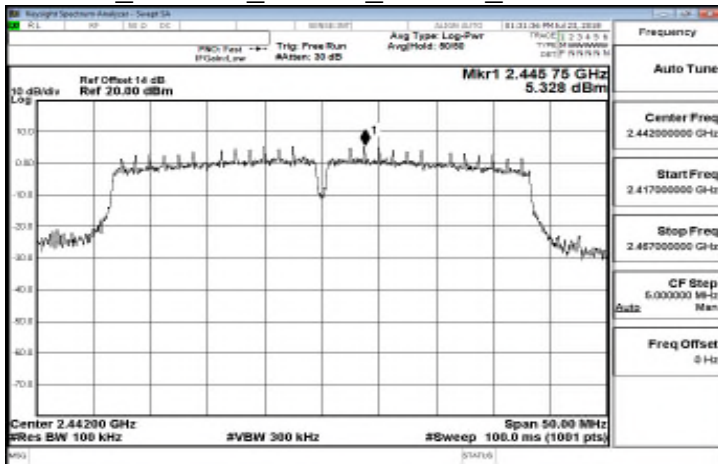
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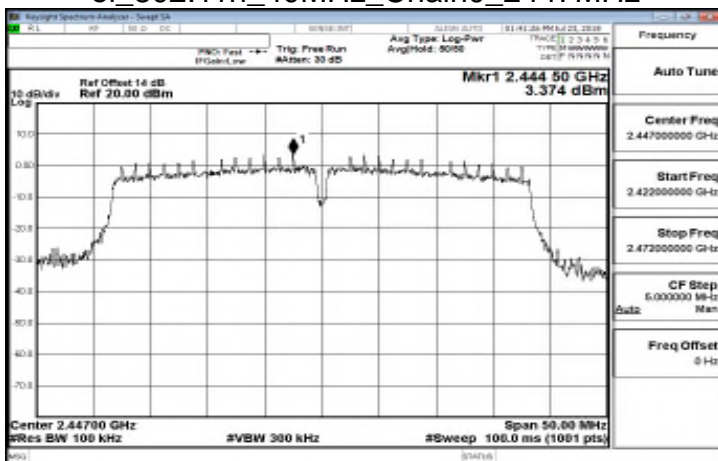
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Reference Lev-  
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Reference Lev-  
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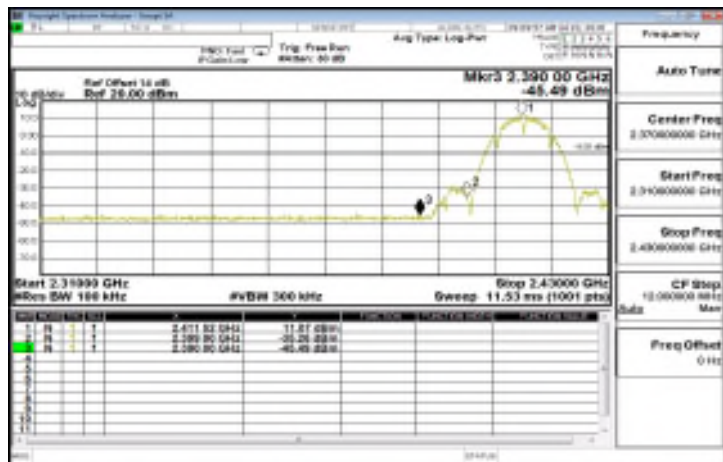
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802.11b

### Band Edge Test Data CH-Low-2412MHz

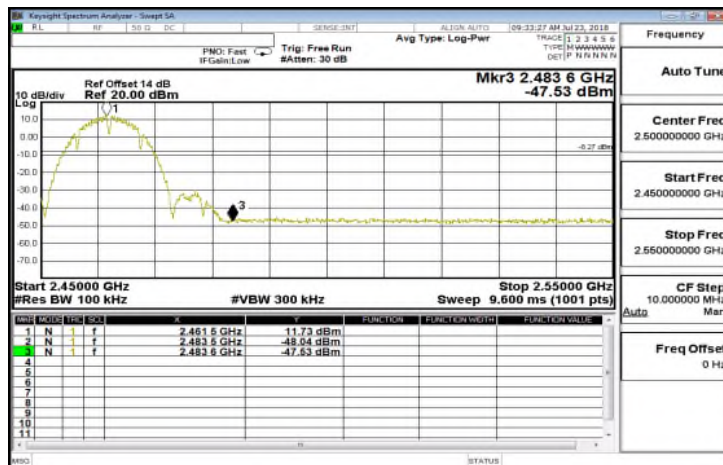


802.11g

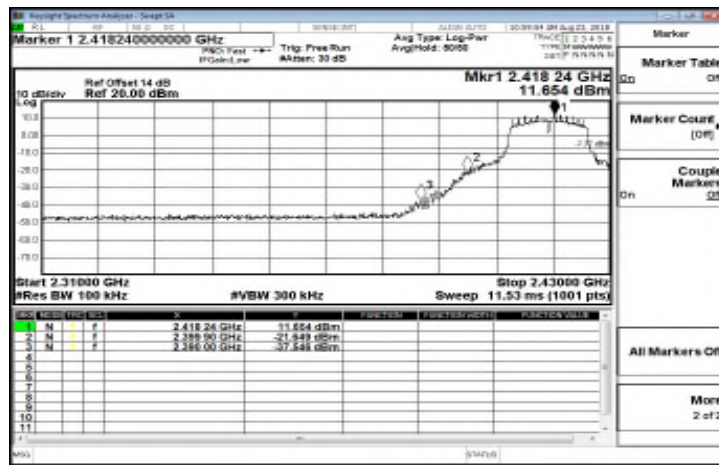
### Band Edge Test Data CH-Low-2412MHz



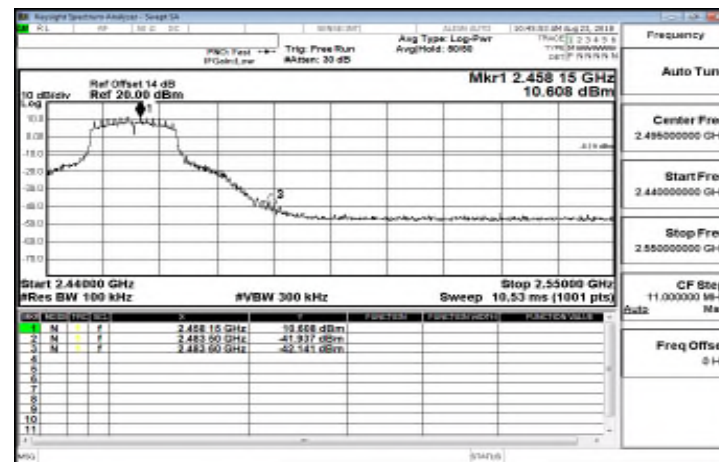
### Band Edge Test Data CH-High-2462MHz



### Band Edge Test Data CH-Low-2417MHz



### Band Edge Test Data CH-High-2457MHz



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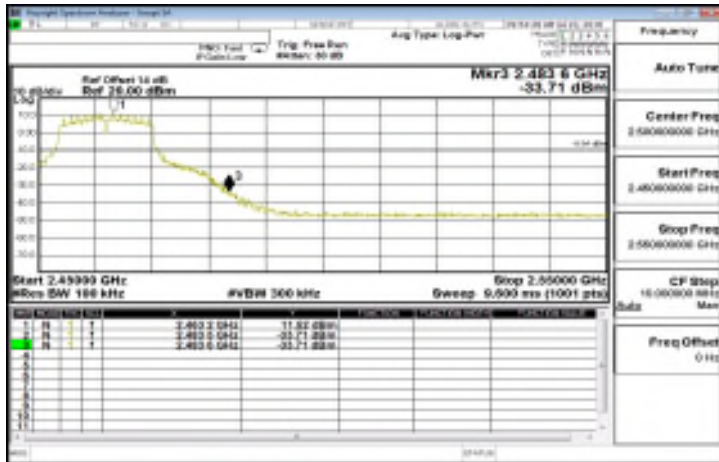
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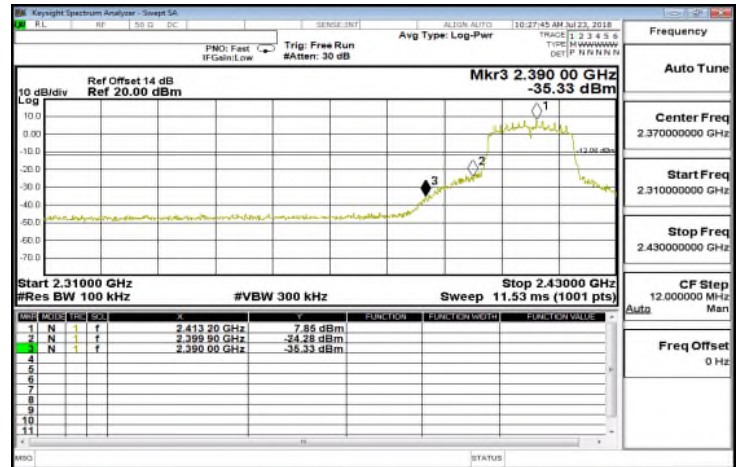
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## Band Edge Test Data CH-High-2462MHz

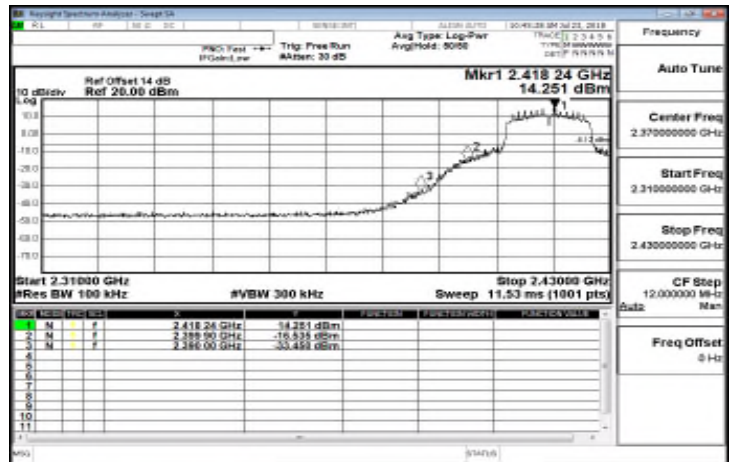


## 802.11n\_HT20

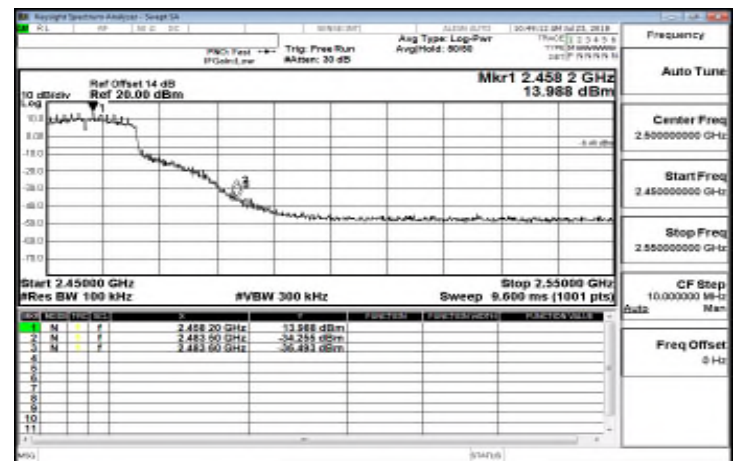
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## Band Edge Test Data CH-Low-2417MHz



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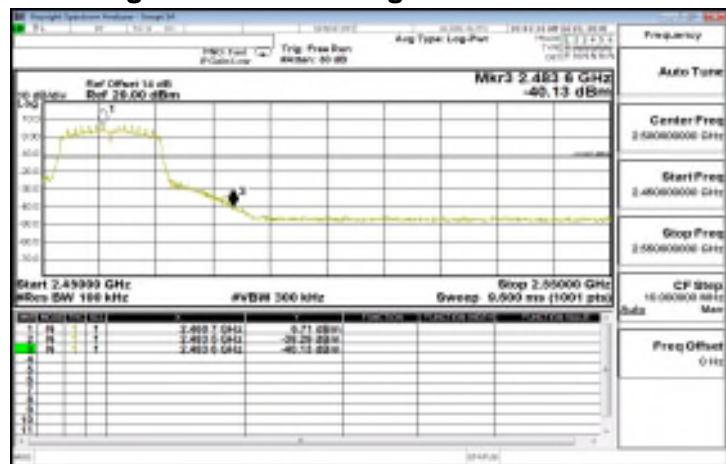
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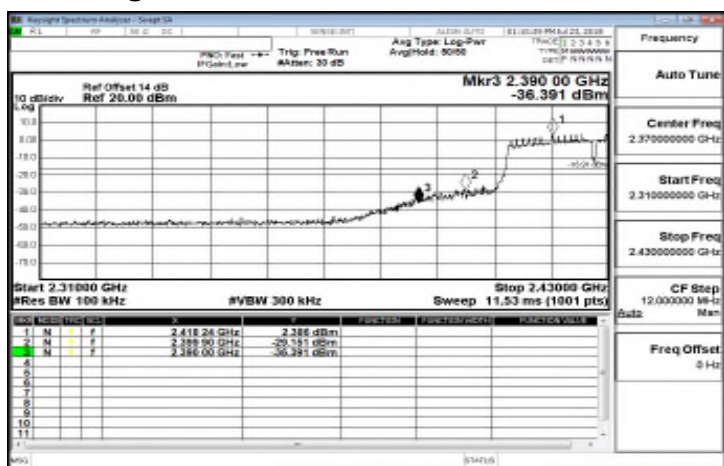


## 802.11n\_HT40

## Band Edge Test Data CH-Low-2422HMz



## Band Edge Test Data CH-Low-2427HMz



## Band Edge Test Data CH-Low-2432HMz



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## Band Edge Test Data CH-High-2442HMz



## Band Edge Test Data CH-High-2447HMz



## Band Edge Test Data CH-High-2452HMz



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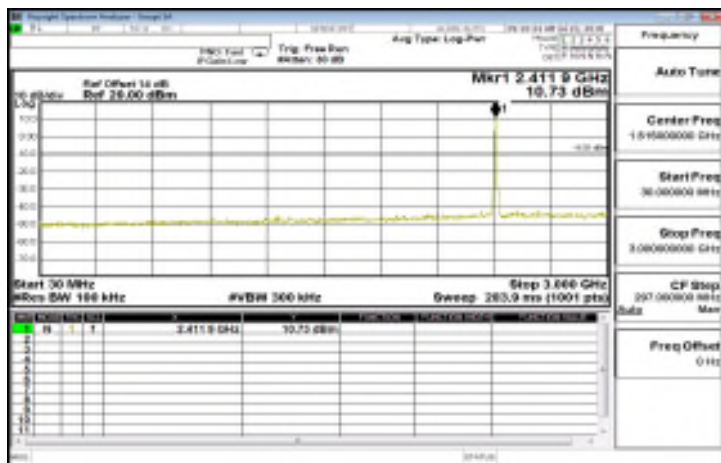
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802.11b

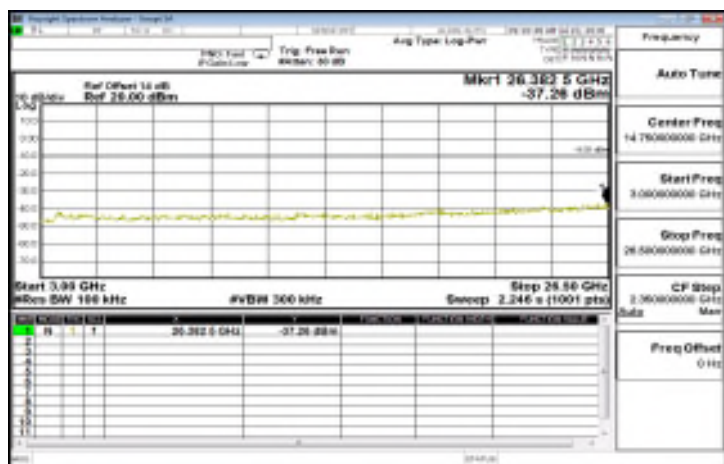
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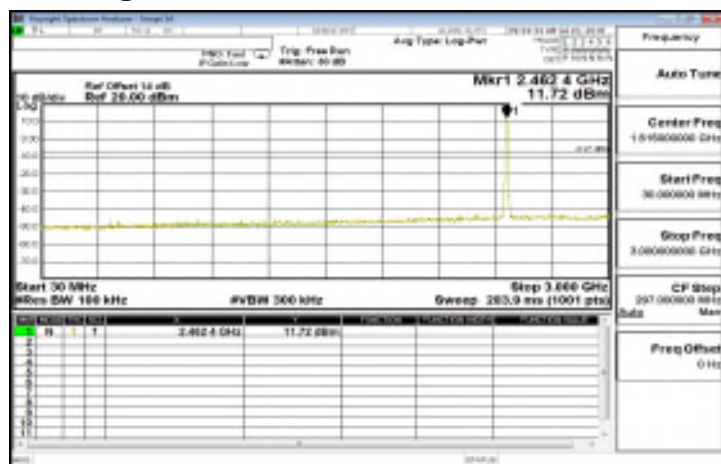
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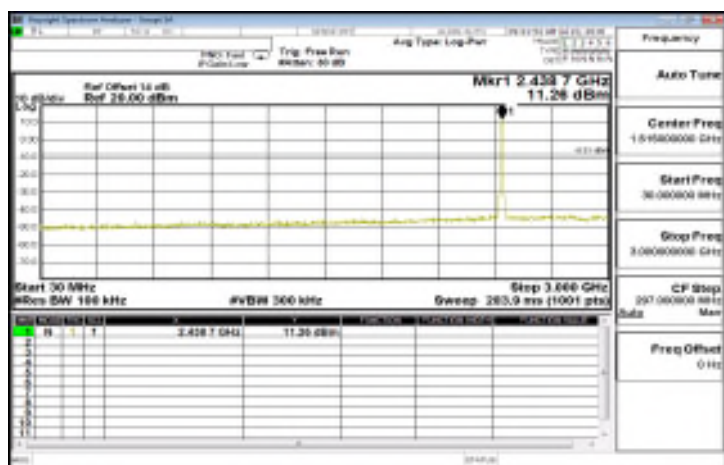
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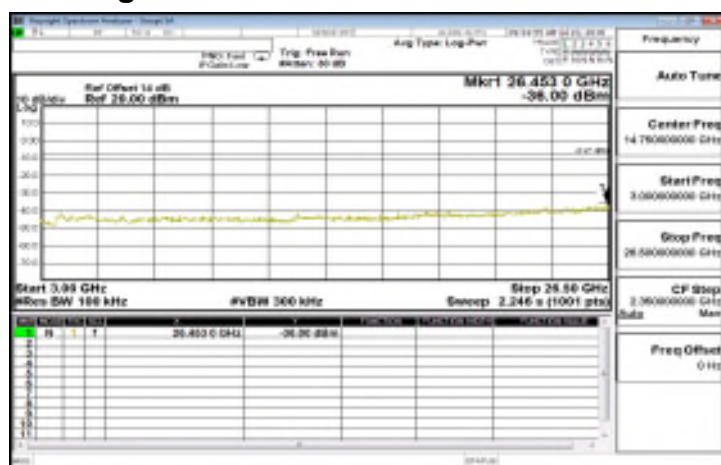
### 30M-3GHz Spurious Emission Test Data CH-High-2462MHz



### 30M-3GHz Spurious Emission Test Data CH-Mid-2437MHz



### 3G-26.5GHz Spurious Emission Test Data CH-High-2462MHz



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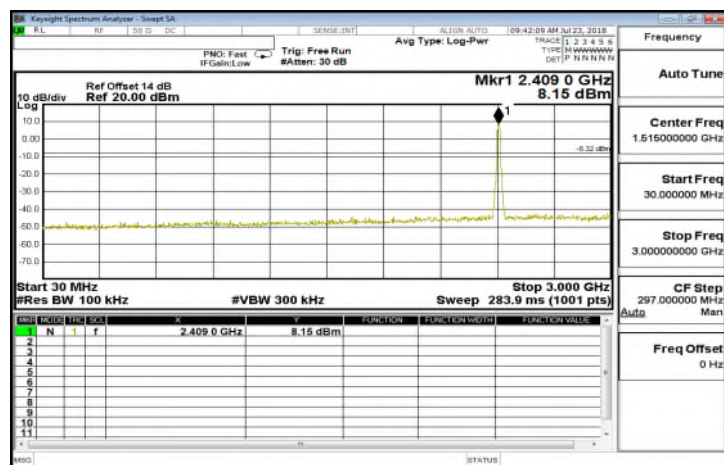
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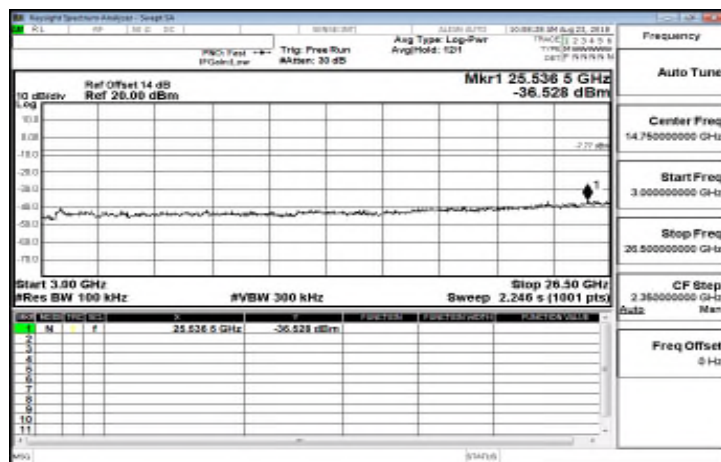


802.11g

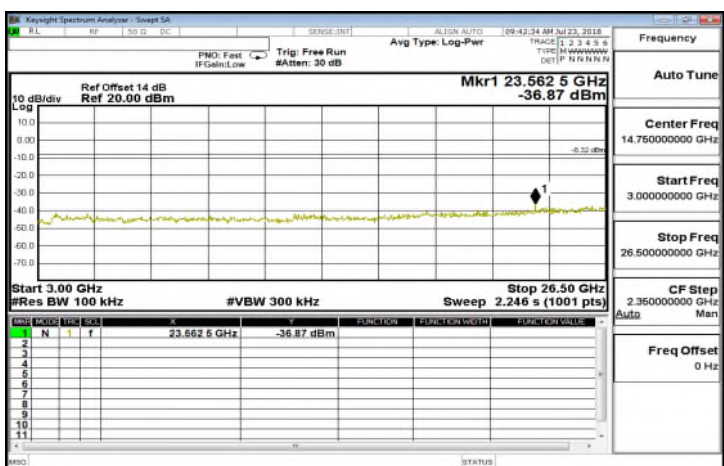
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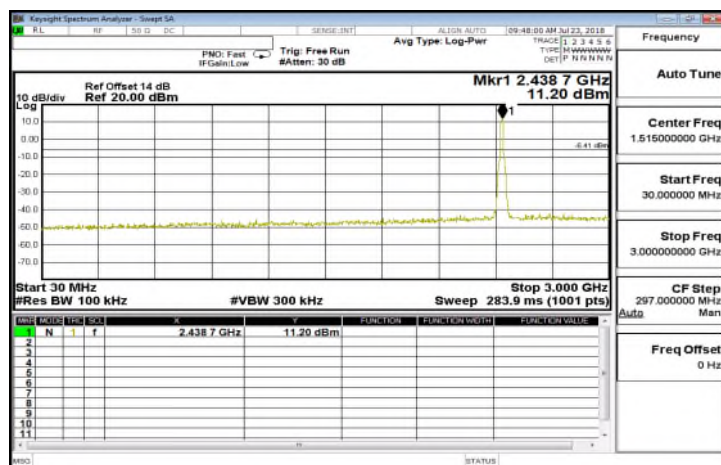
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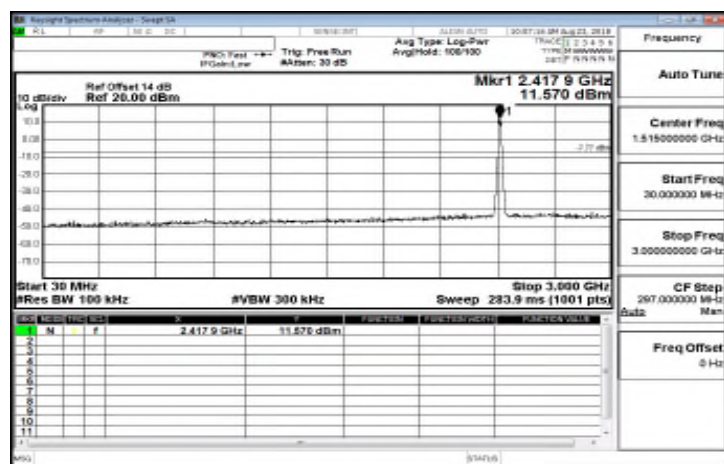
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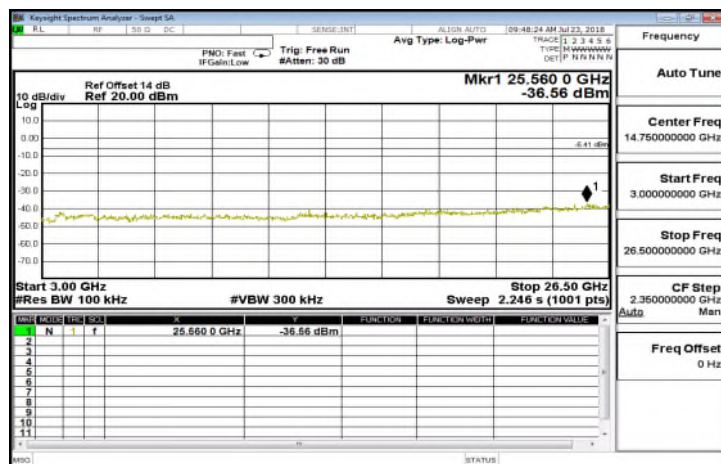
### 30M-3GHz Spurious Emission Test Data CH-Mid-2437MHz



### 30M-3GHz Spurious Emission Test Data CH-Low-2417MHz



### 3G-26.5GHz Spurious Emission Test Data CH-Mid-2437MHz

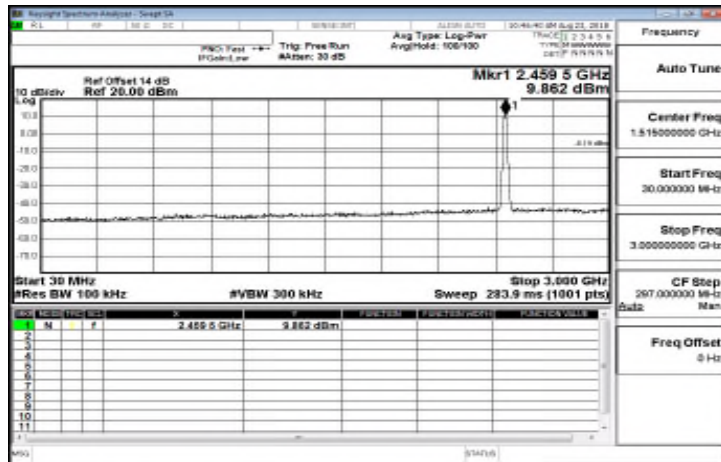


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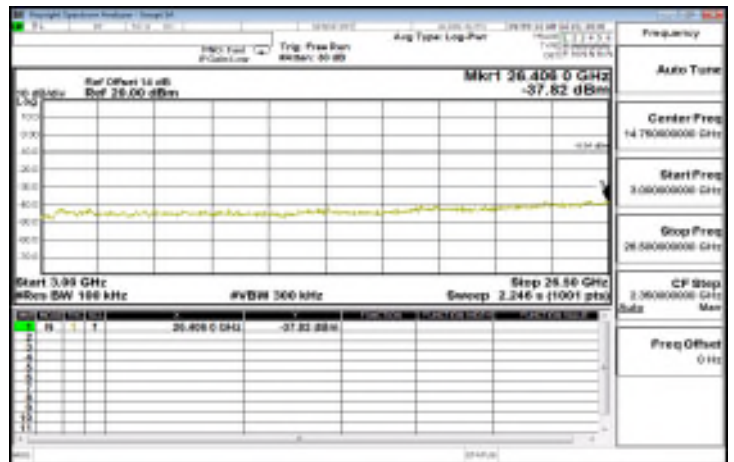
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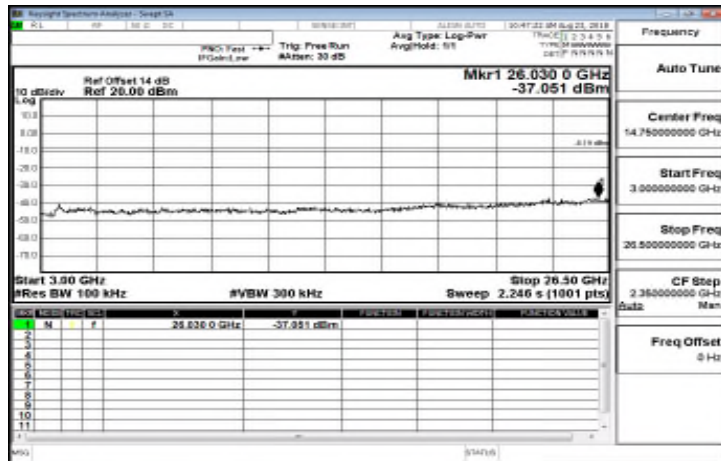
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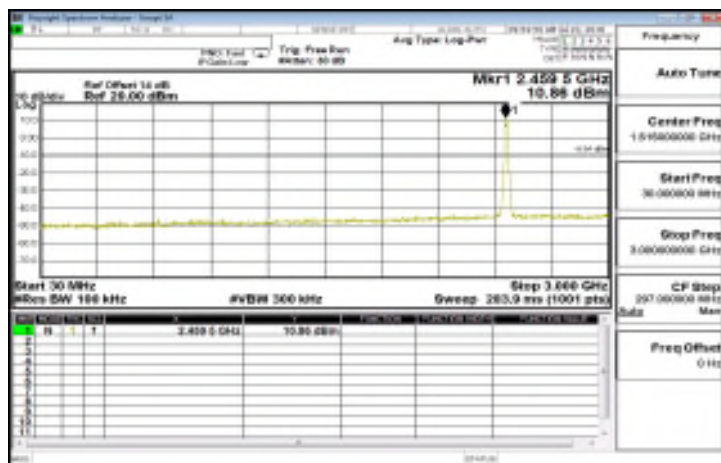
## 3G-26.5GHz Spurious Emission Test Data CH-High-2462MHz



## 3G-26.5GHz Spurious Emission Test Data CH-High-2457MHz



## 30M-3GHz Spurious Emission Test Data CH-High-2462MHz



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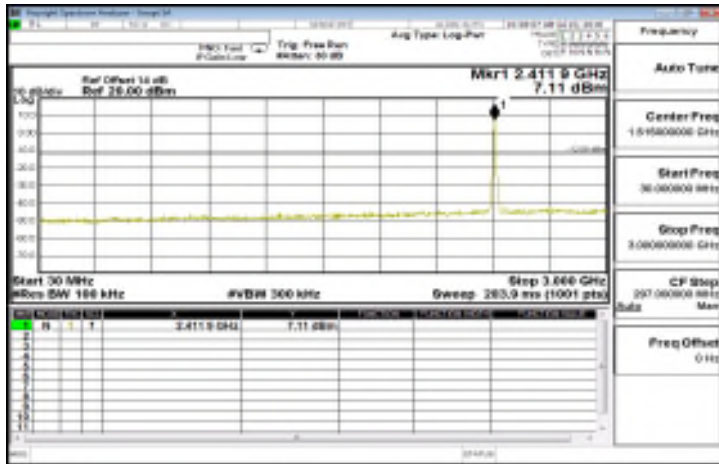
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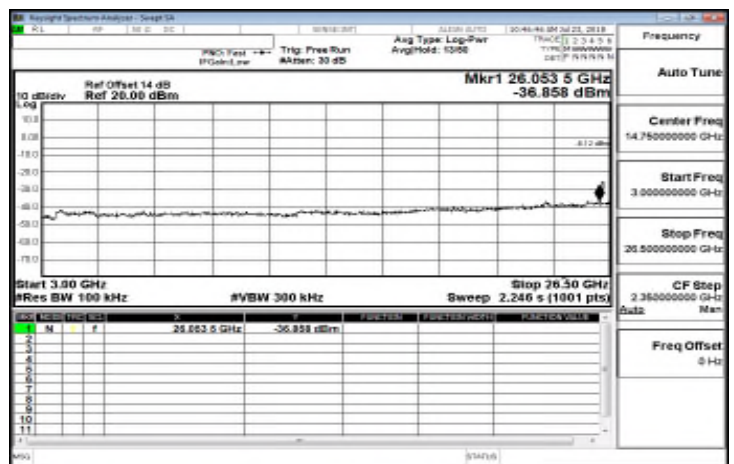


## 802.11n\_HT20

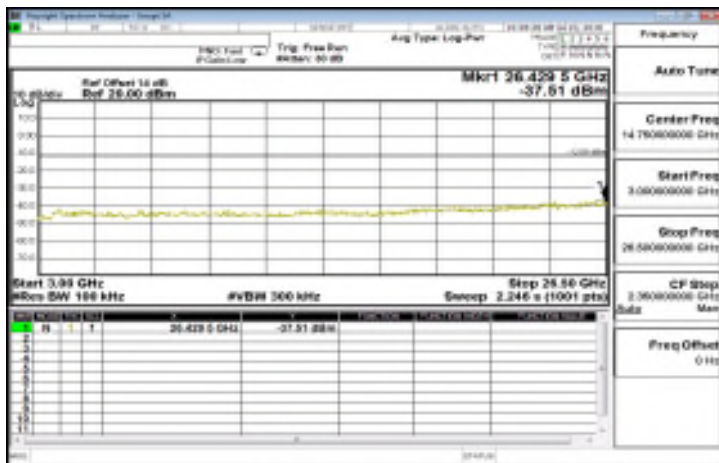
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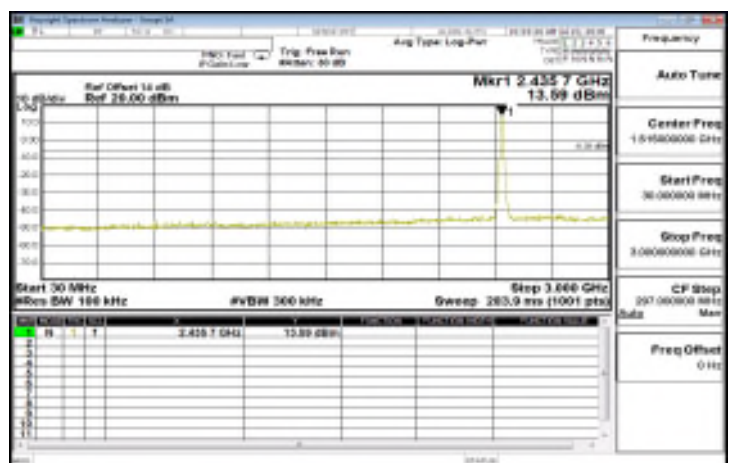
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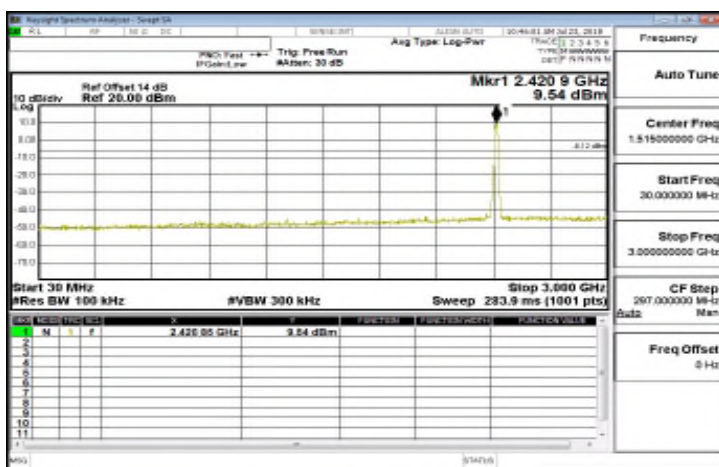
### 3G-26.5GHz Spurious Emission Test Data CH-Low-2412MHz



### 30M-3GHz Spurious Emission Test Data CH-Mid-2437MHz



### 30M-3GHz Spurious Emission Test Data CH-Low-2417MHz



### 3G-26.5GHz Spurious Emission Test Data CH-Mid-2437MHz



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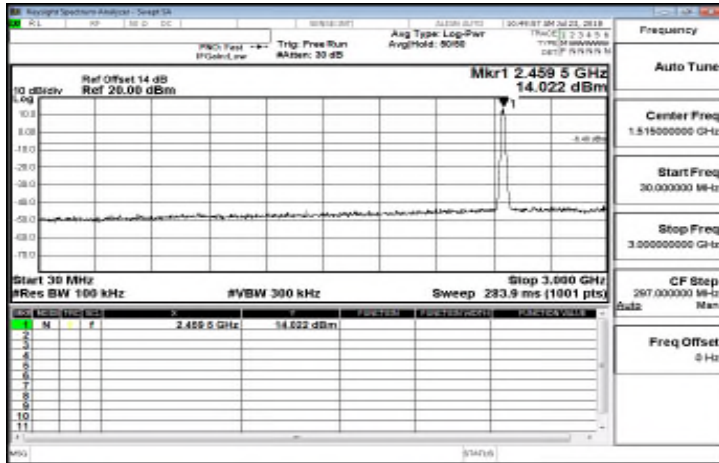
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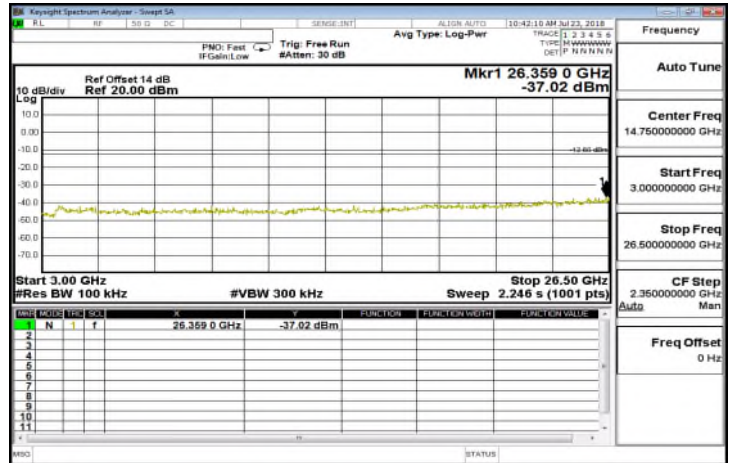
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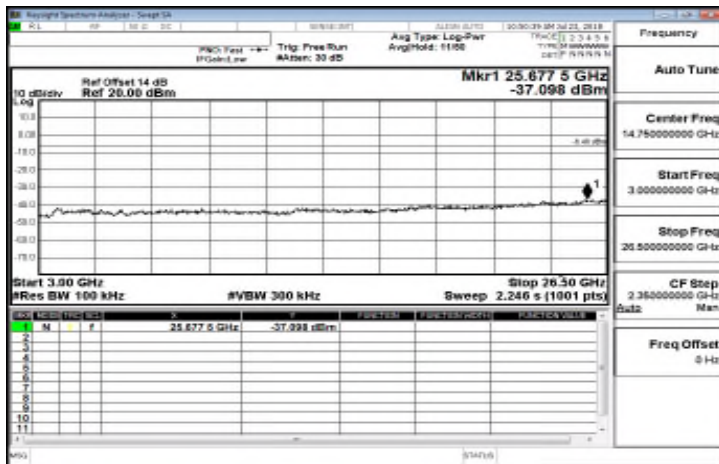
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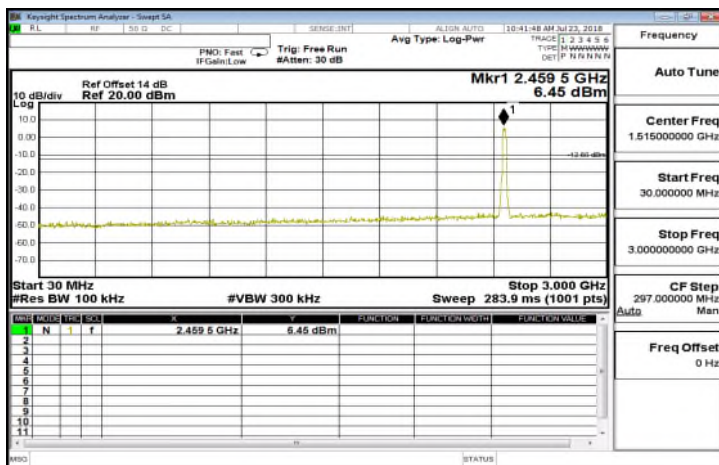
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### 3G-26.5GHz Spurious Emission Test Data CH-High-2457MHz



### 30M-3GHz Spurious Emission Test Data CH-High-2462MHz



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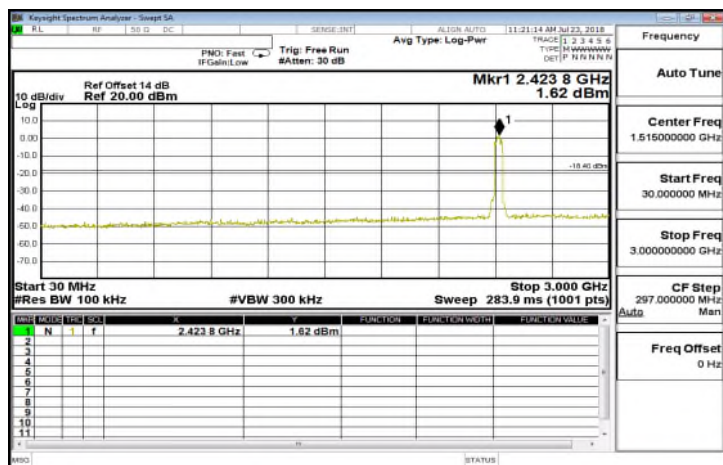
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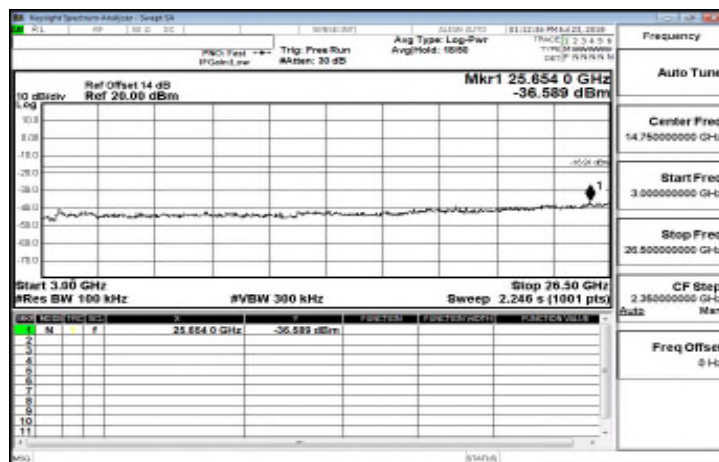


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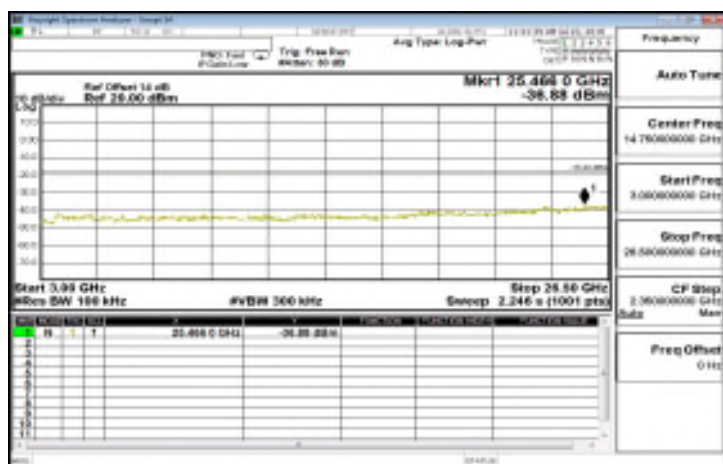
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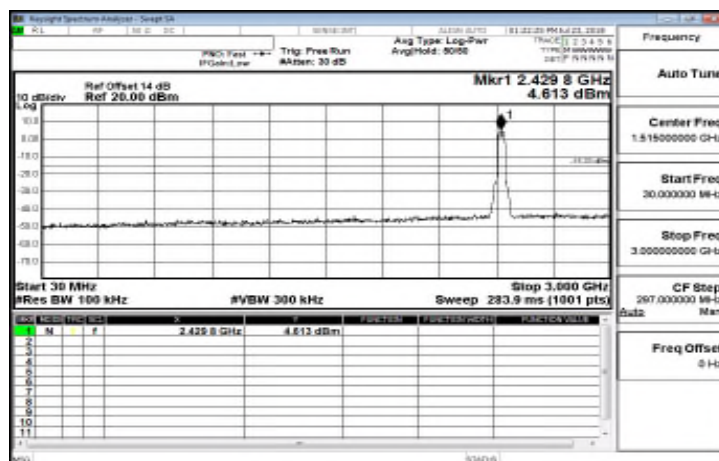
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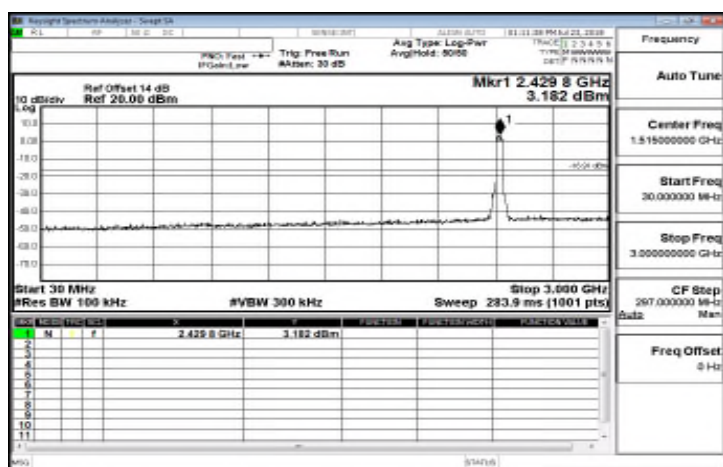
### 3G-26.5GHz Spurious Emission Test Data CH-Low-2422MHz



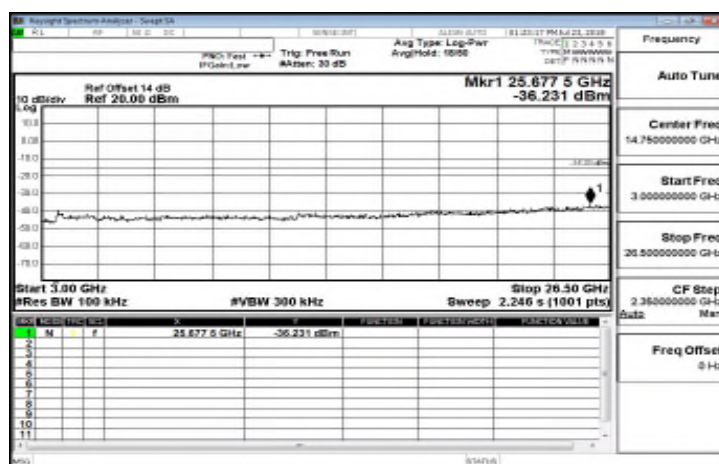
### 30M-3GHz Spurious Emission Test Data CH-Low-2432MHz



### 30M-3GHz Spurious Emission Test Data CH-Low-2427MHz



### 3G-26.5GHz Spurious Emission Test Data CH-Low-2432MHz



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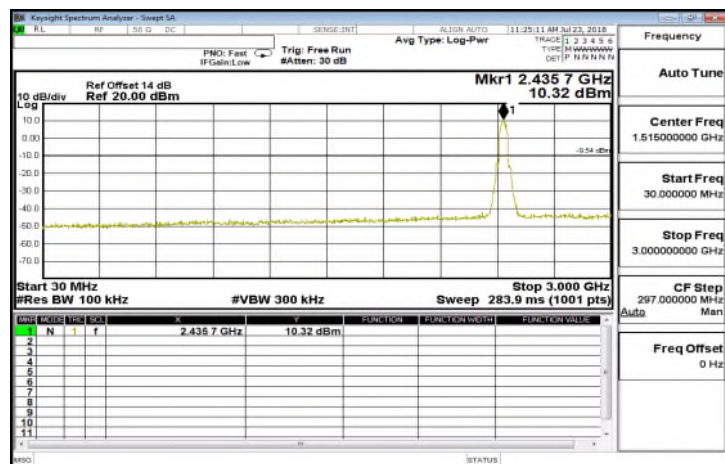
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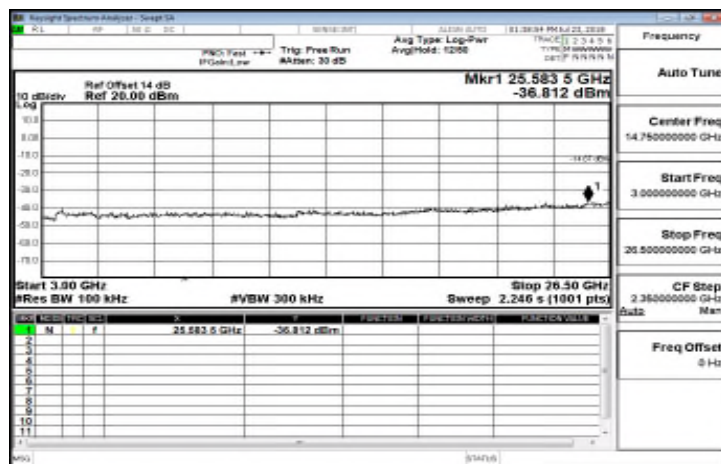
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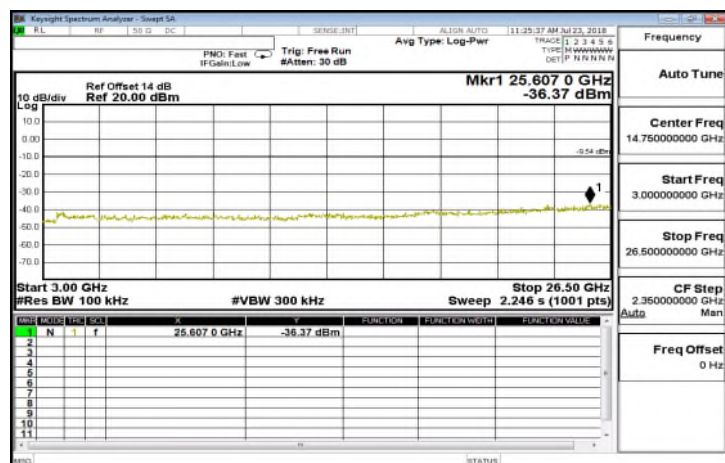
### 30M-3GHz Spurious Emission Test Data CH-Mid-2437 MHz-2437MHz



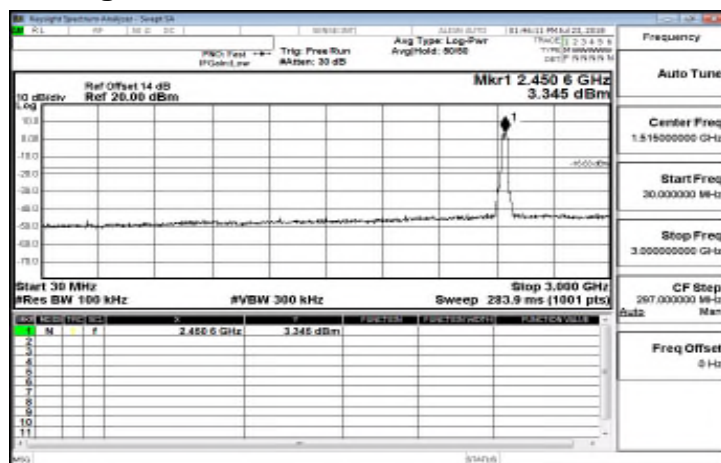
### 3G-26.5GHz Spurious Emission Test Data CH-High-2442MHz



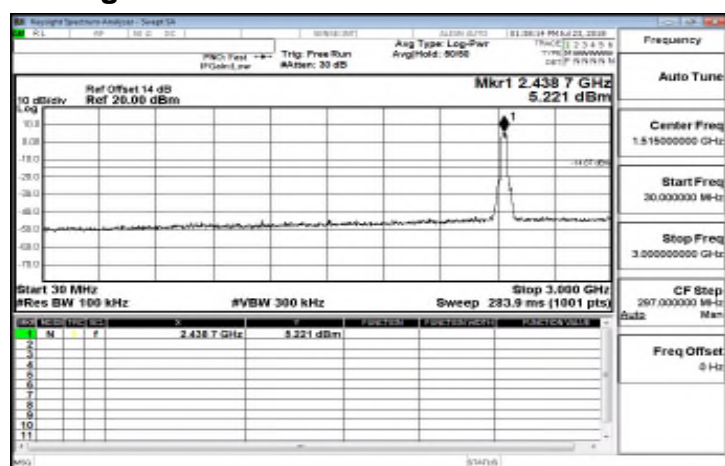
### 3G-26.5GHz Spurious Emission Test Data CH-Mid-2437 MHz



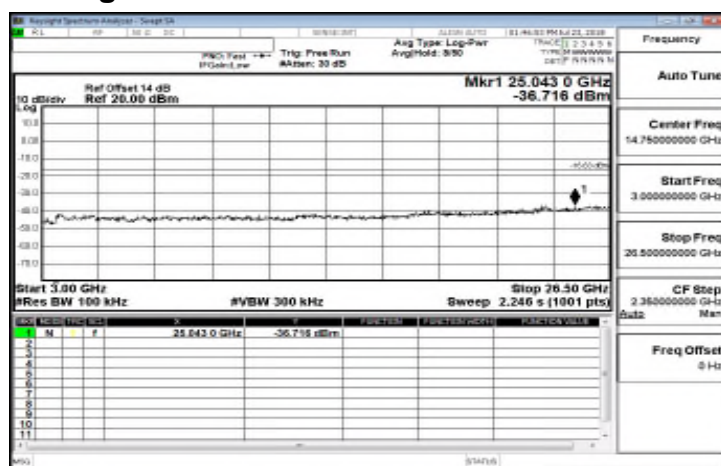
### 30M-3GHz Spurious Emission Test Data CH-High-2447MHz



### 30M-3GHz Spurious Emission Test Data CH-High-2442MHz



### 3G-26.5GHz Spurious Emission Test Data CH-High-2447MHz

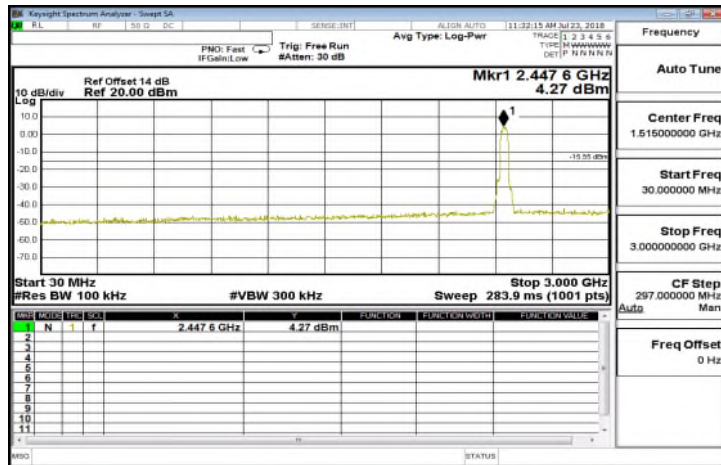


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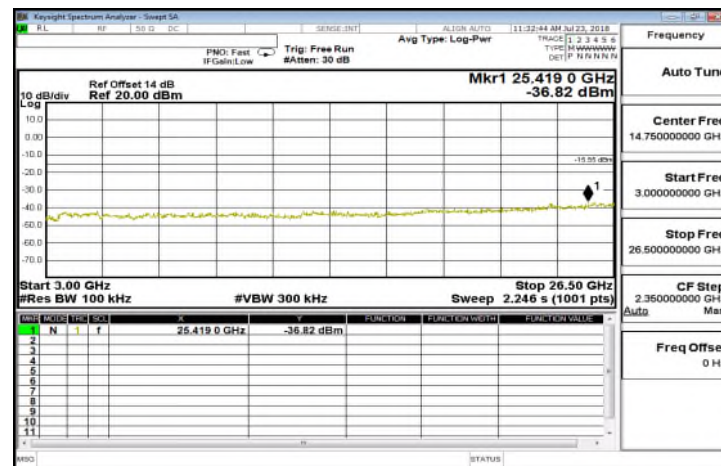
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## 30M-3GHz Spurious Emission Test Data CH-High-2452MHz



## 3G-26.5GHz Spurious Emission Test Data CH-High-2452MHz



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## 11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

### 11.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

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## 11.2 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Broadband Antenna	TESEQ	CBL 6112D	35243	2017/11/10	2018/11/9
Horn Antenna	Schwarzbeck	BBHA9120D	1187	2018/01/04	2019/1/3
Loop Antenna	ETS.LINDGREN	6502	148045	2017/09/26	2018/9/25
Horn Antenna	SCHWAZBECK	BBHA9170	184	2017/12/12	2018/12/11
EMI Test Receiver	R&S	ESU 40	100363	2018/04/11	2019/4/10
Pre-Amplifier	EMC Instruments	EMC330	980096	2017/12/26	2018/12/25
Pre-Amplifier	EMC Instruments	EMC0011830	980199	2017/12/26	2018/12/25
Pre-Amplifier	EMC Instruments	EMC184045B	980135	2017/10/27	2018/10/26
Coaxial Cable	Huber Suhner	SUCOFLEX 104	MY17388/4	2017/12/26	2018/12/25
Coaxial Cable	Huber Suhner	RG 214/U	W22.03	2017/12/26	2018/12/25

NOTE: N.C.R refers to Not Calibrated Required.

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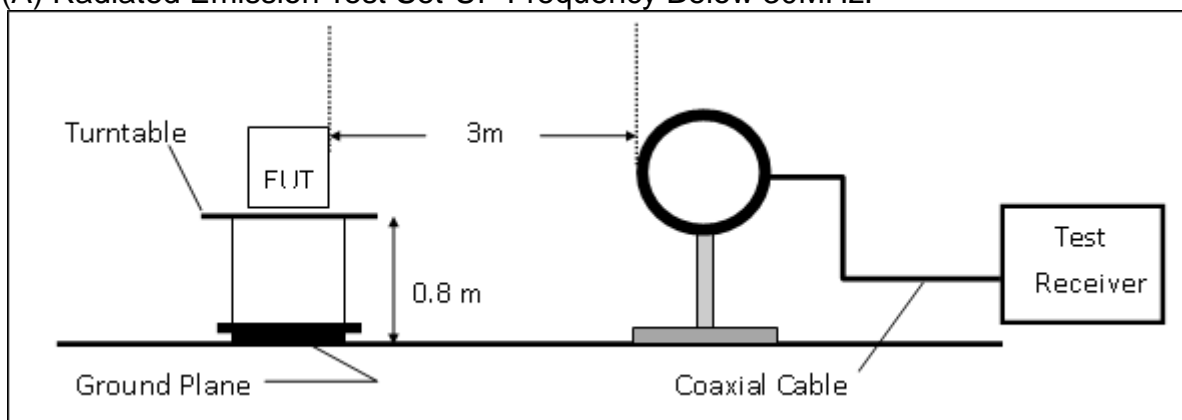
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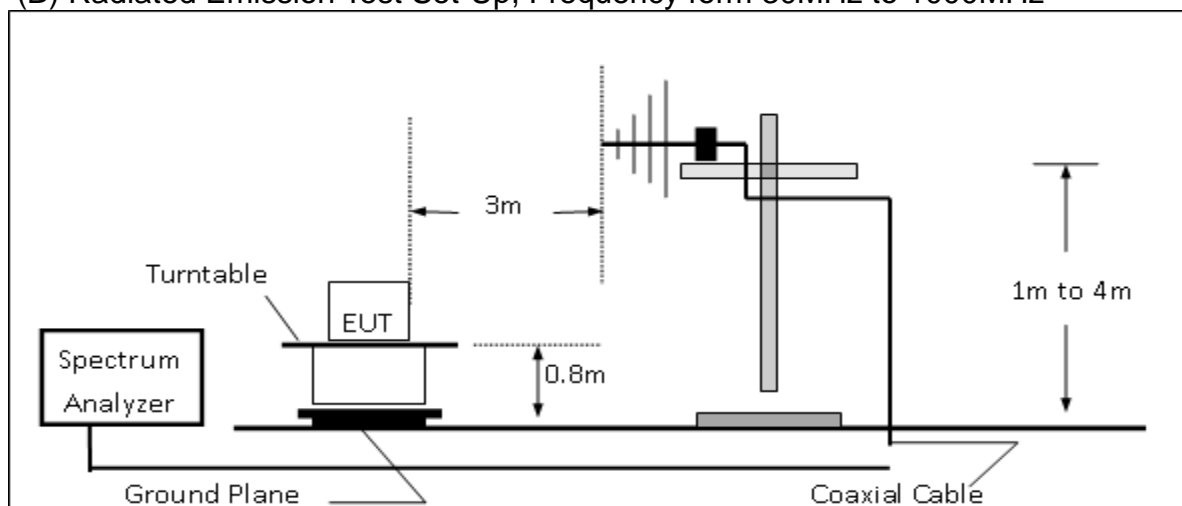
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### 11.3 Test SET-UP

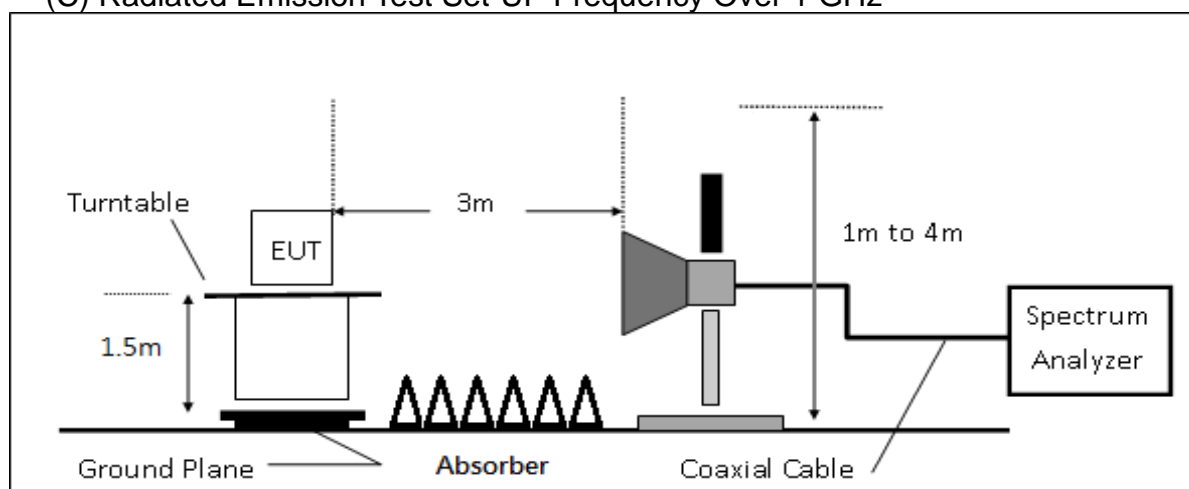
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-UP, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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## 11.4 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
12. Repeat above procedures until all default test channel measured were complete.

## 11.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

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### 11.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

### 11.7 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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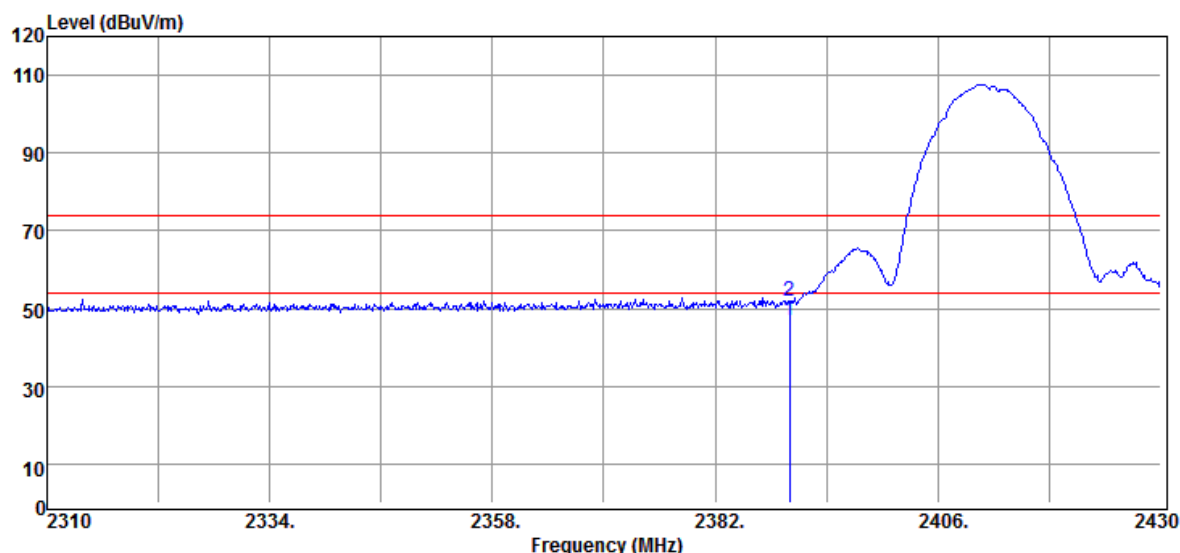
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## Radiated Band Edge Measurement Result

Operation Mode	:802.11b	Test Date	:2018-07-09
Test Mode	:BE CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2390.00	Average	43.58	3.39	46.97	54.00	-7.03
2390.00	Peak	48.64	3.39	52.03	74.00	-21.97

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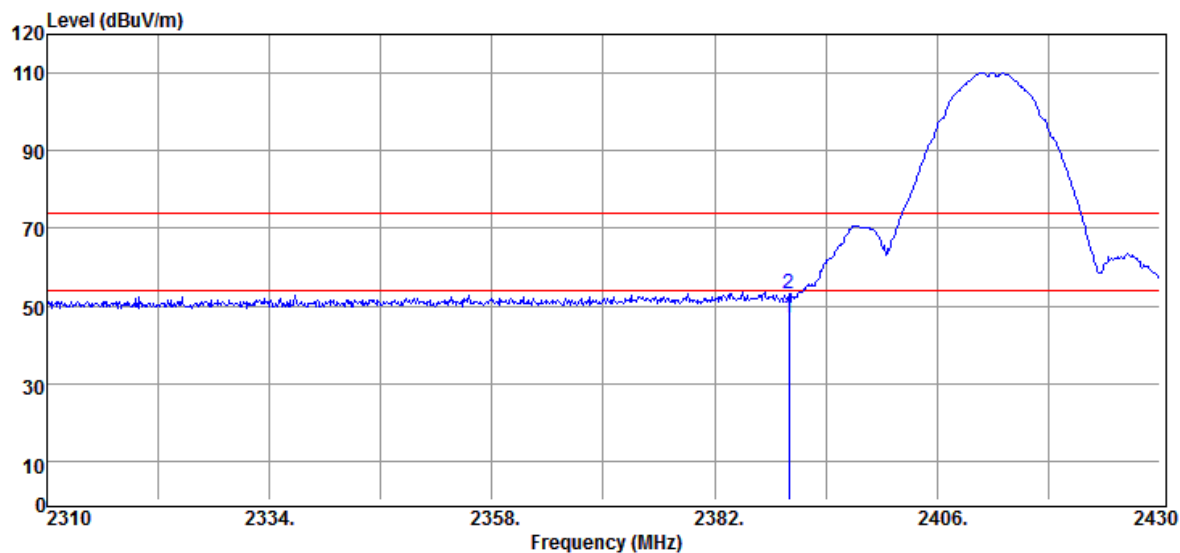
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Operation Mode	:802.11b	Test Date	:2018-07-09
Test Mode	:BE CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2390.00	Average	43.61	3.39	47.00	54.00	-7.00
2390.00	Peak	49.64	3.39	53.03	74.00	-20.97

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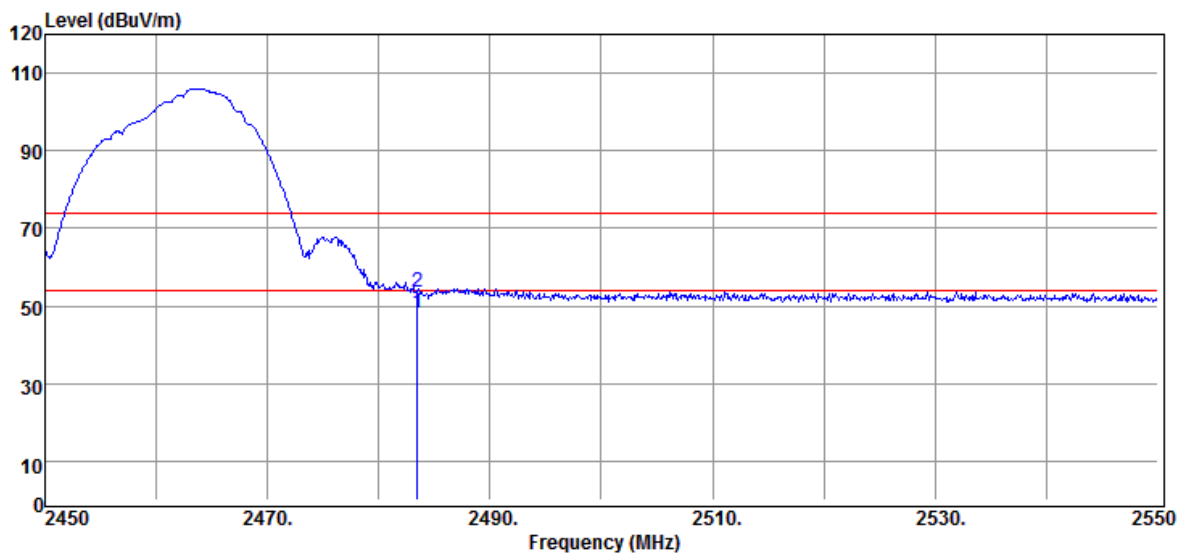
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Operation Mode :802.11b  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2462 MHz

Test Date :2018-07-09  
Temp./Humi. :23/61  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	44.14	3.96	48.10	54.00	-5.90
2483.50	Peak	49.56	3.96	53.52	74.00	-20.48

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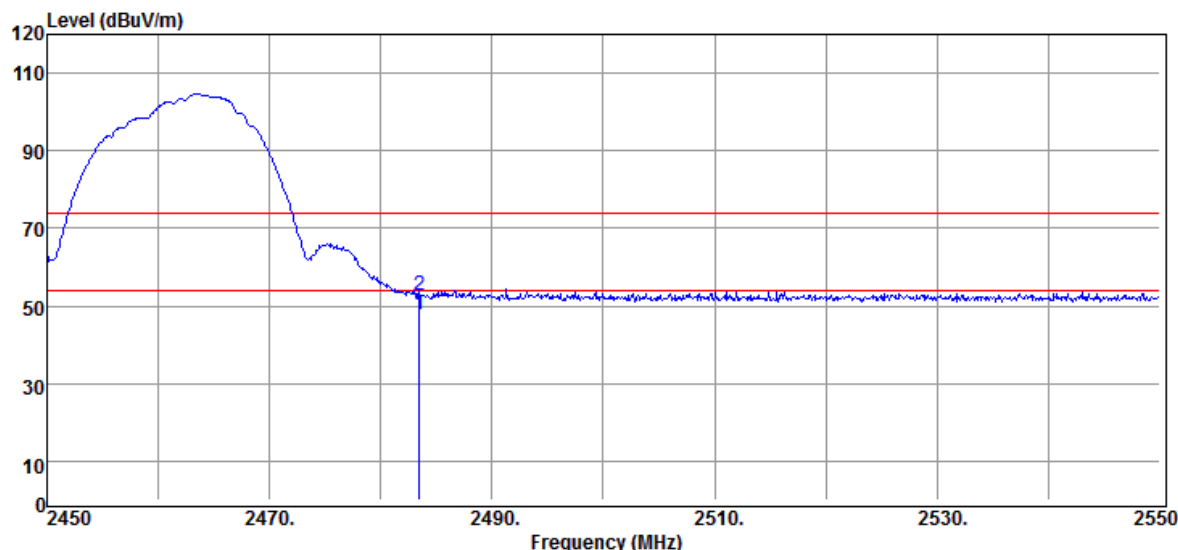
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Operation Mode :802.11b  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2462 MHz

Test Date :2018-07-09  
Temp./Humi. :23/61  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	43.86	3.96	47.82	54.00	-6.18
2483.50	Peak	48.90	3.96	52.86	74.00	-21.14

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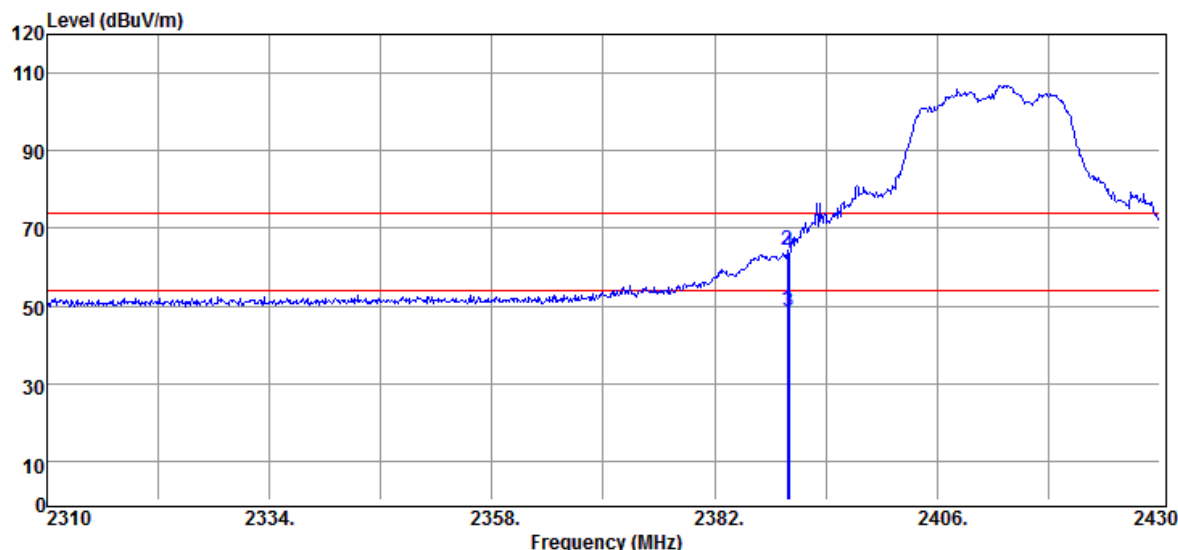
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Operation Mode :802.11g  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :2412 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.80	Average	45.73	3.39	49.12	54.00	-4.88
2389.80	Peak	60.91	3.39	64.30	74.00	-9.70
2390.00	Average	45.26	3.39	48.65	54.00	-5.35
2390.00	Peak	60.22	3.39	63.61	74.00	-10.39

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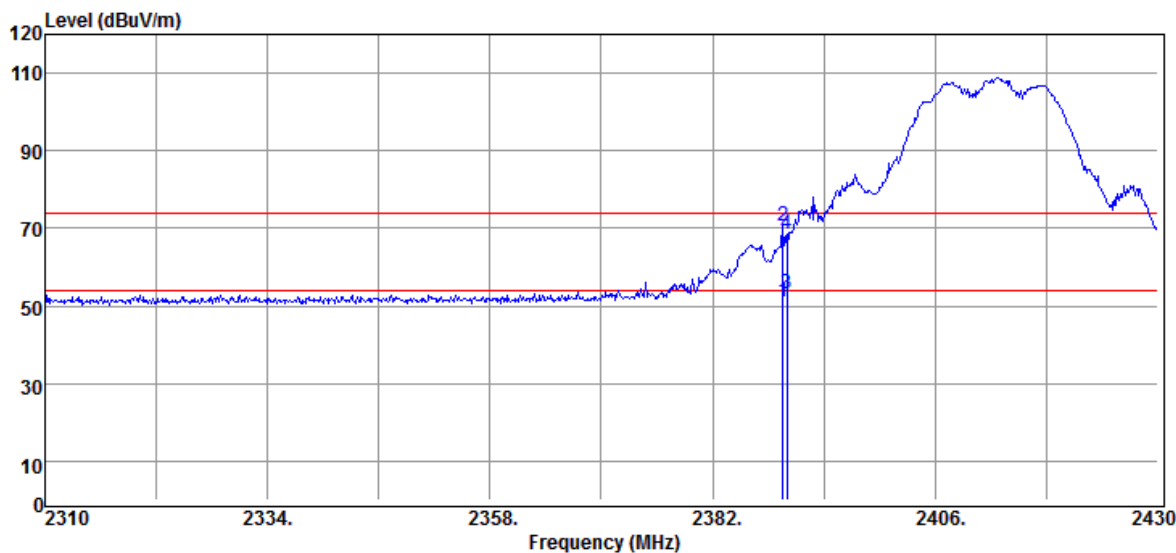
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Operation Mode	:802.11g	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:22/69
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.56	Average	47.51	3.40	50.91	54.00	-3.09
2389.56	Peak	67.25	3.40	70.65	74.00	-3.35
2390.00	Average	49.61	3.39	53.00	54.00	-1.00
2390.00	Peak	65.26	3.39	68.65	74.00	-5.35

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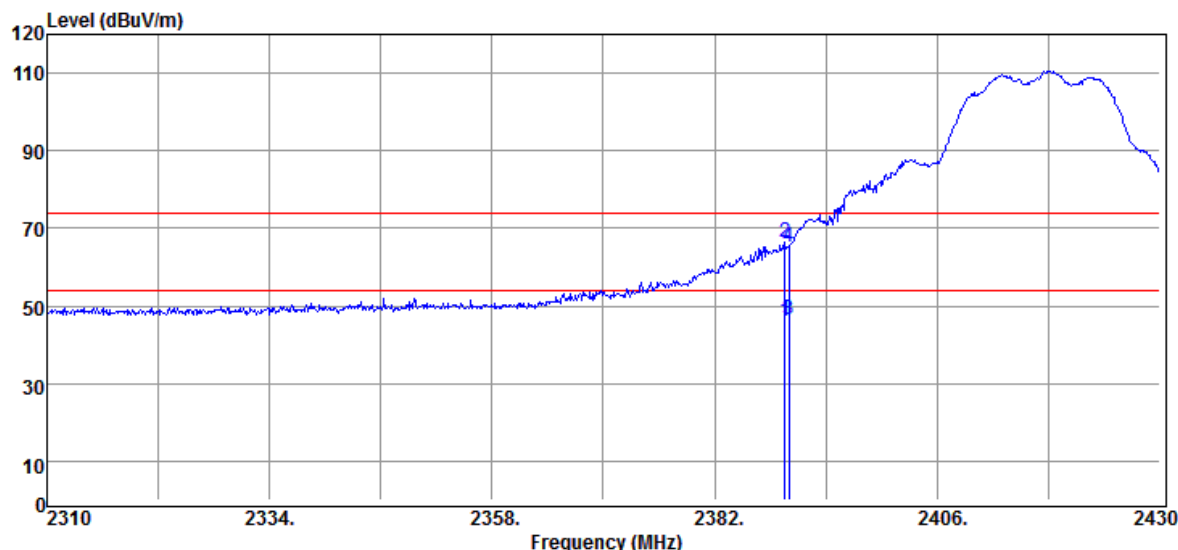
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Operation Mode :802.11g  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :2417 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.56	Average	42.80	3.40	46.20	54.00	-7.80
2389.56	Peak	63.19	3.40	66.59	74.00	-7.41
2390.00	Average	43.21	3.39	46.60	54.00	-7.40
2390.00	Peak	61.79	3.39	65.18	74.00	-8.82

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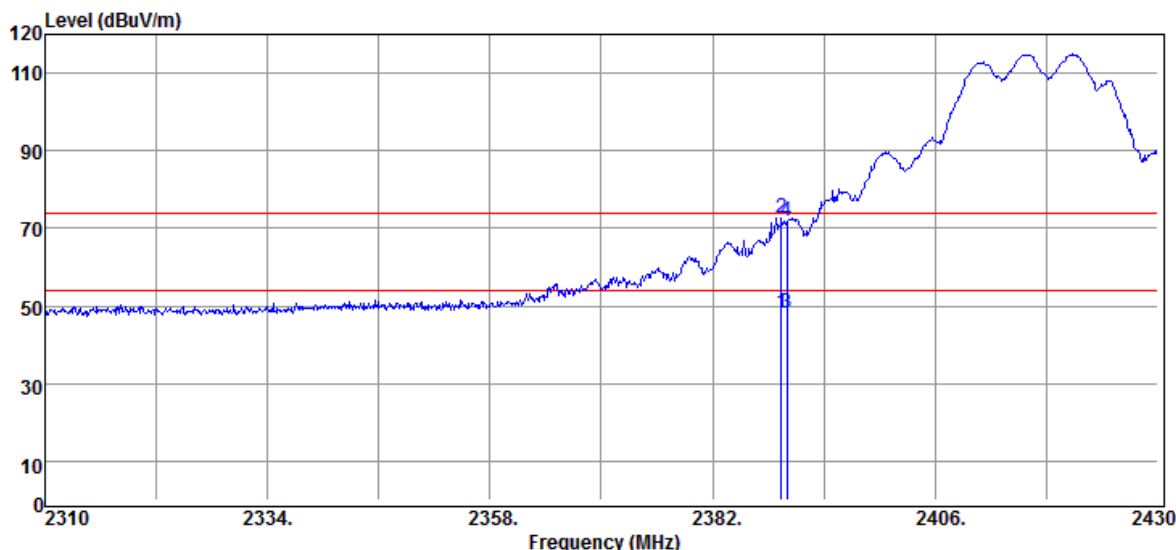
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Operation Mode	:802.11g	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:22/69
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2417 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.44	Average	44.71	3.40	48.11	54.00	-5.89
2389.44	Peak	69.47	3.40	72.87	74.00	-1.13
2390.00	Average	44.76	3.39	48.15	54.00	-5.85
2390.00	Peak	68.25	3.39	71.64	74.00	-2.36

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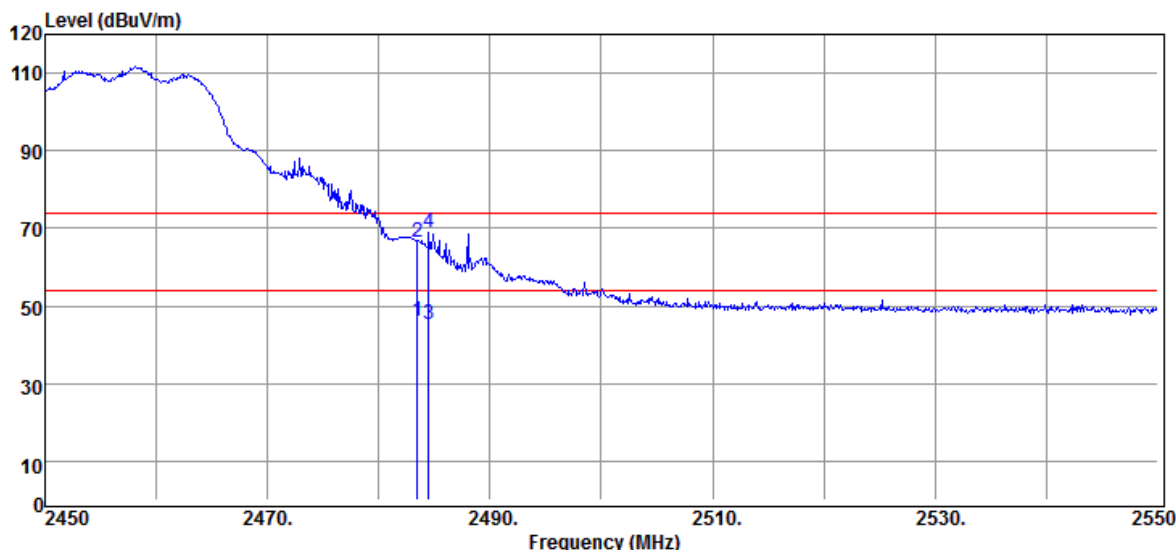
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Operation Mode :802.11g  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2457 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	41.96	3.96	45.92	54.00	-8.08
2483.50	Peak	62.63	3.96	66.59	74.00	-7.41
2484.50	Average	41.48	3.96	45.44	54.00	-8.56
2484.50	Peak	64.88	3.96	68.84	74.00	-5.16

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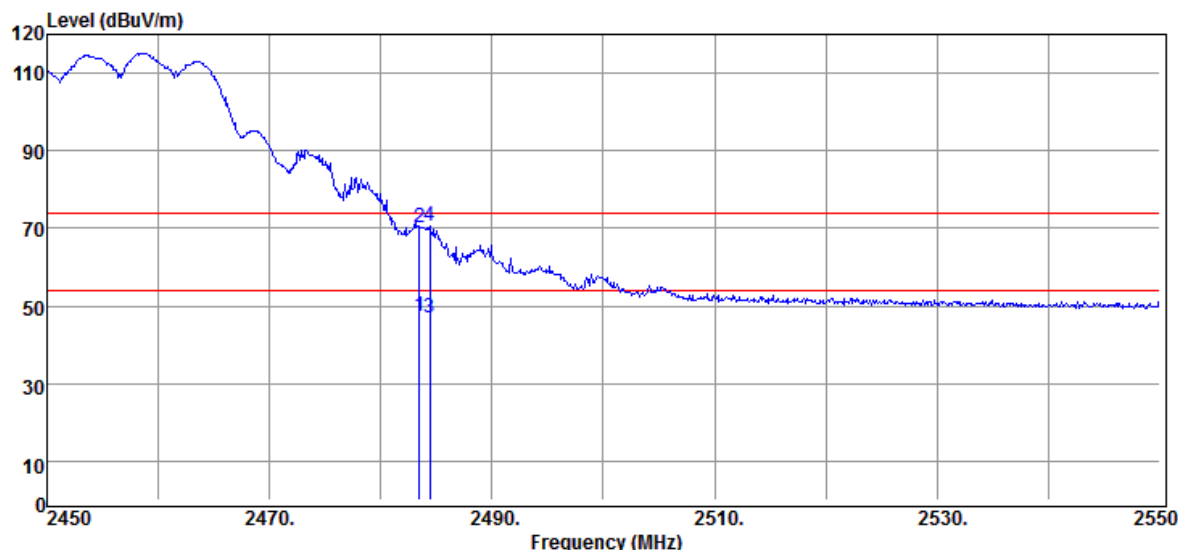
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Operation Mode :802.11g  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2457 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	43.17	3.96	47.13	54.00	-6.87
2483.50	Peak	66.40	3.96	70.36	74.00	-3.64
2484.40	Average	43.06	3.96	47.02	54.00	-6.98
2484.40	Peak	66.56	3.96	70.52	74.00	-3.48

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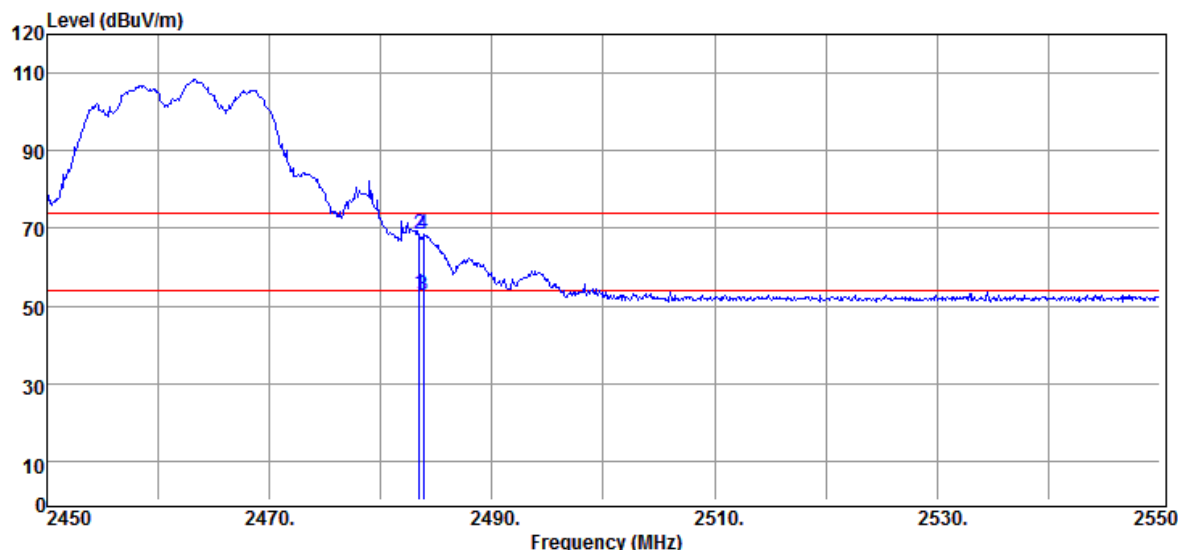
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Operation Mode :802.11g  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2462 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	49.03	3.96	52.99	54.00	-1.01
2483.50	Peak	64.60	3.96	68.56	74.00	-5.44
2483.80	Average	48.87	3.96	52.83	54.00	-1.17
2483.80	Peak	64.67	3.96	68.63	74.00	-5.37

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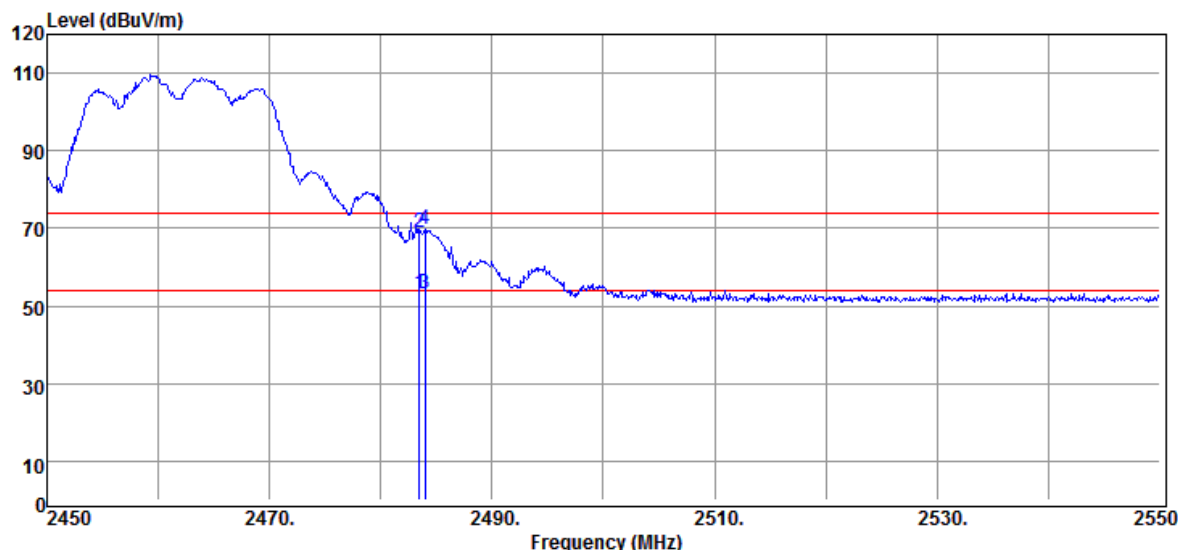
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Operation Mode :802.11g  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2462 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	48.99	3.96	52.95	54.00	-1.05
2483.50	Peak	65.02	3.96	68.98	74.00	-5.02
2484.00	Average	49.03	3.96	52.99	54.00	-1.01
2484.00	Peak	65.88	3.96	69.84	74.00	-4.16

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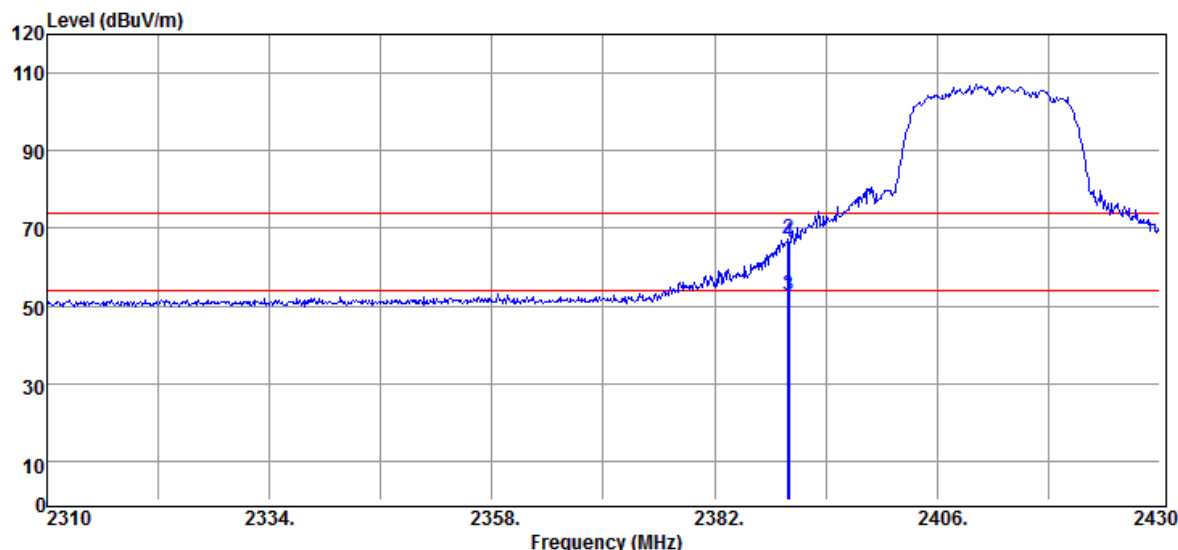
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Operation Mode :802.11n20  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :2412 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.92	Average	49.29	3.39	52.68	54.00	-1.32
2389.92	Peak	63.72	3.39	67.11	74.00	-6.89
2390.00	Average	49.44	3.39	52.83	54.00	-1.17
2390.00	Peak	63.25	3.39	66.64	74.00	-7.36

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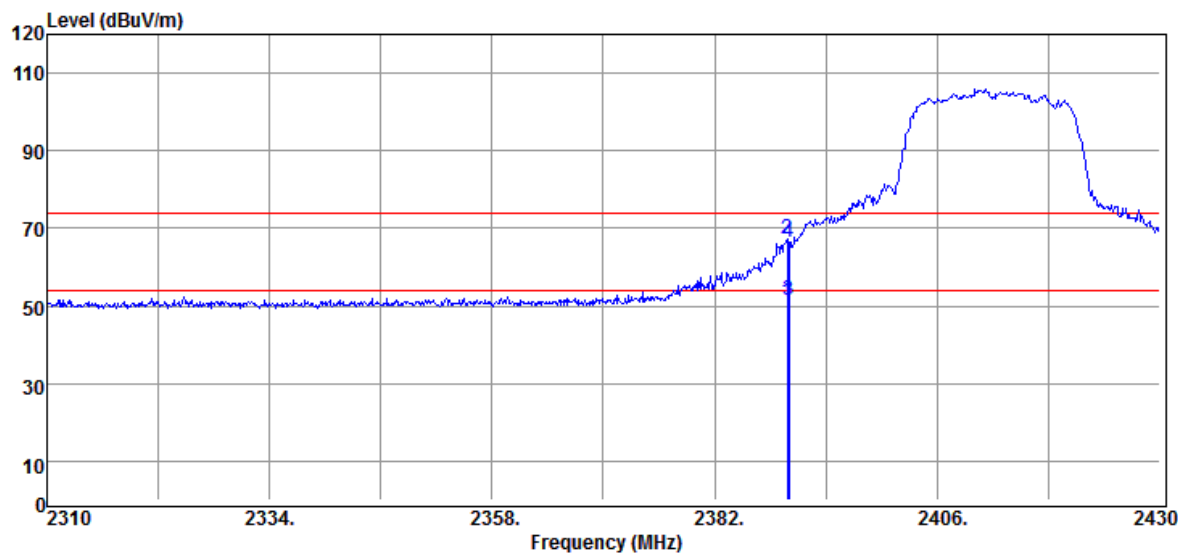
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Operation Mode	:802.11n20	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:22/69
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.80	Average	47.79	3.39	51.18	54.00	-2.82
2389.80	Peak	63.88	3.39	67.27	74.00	-6.73
2390.00	Average	48.19	3.39	51.58	54.00	-2.42
2390.00	Peak	63.07	3.39	66.46	74.00	-7.54

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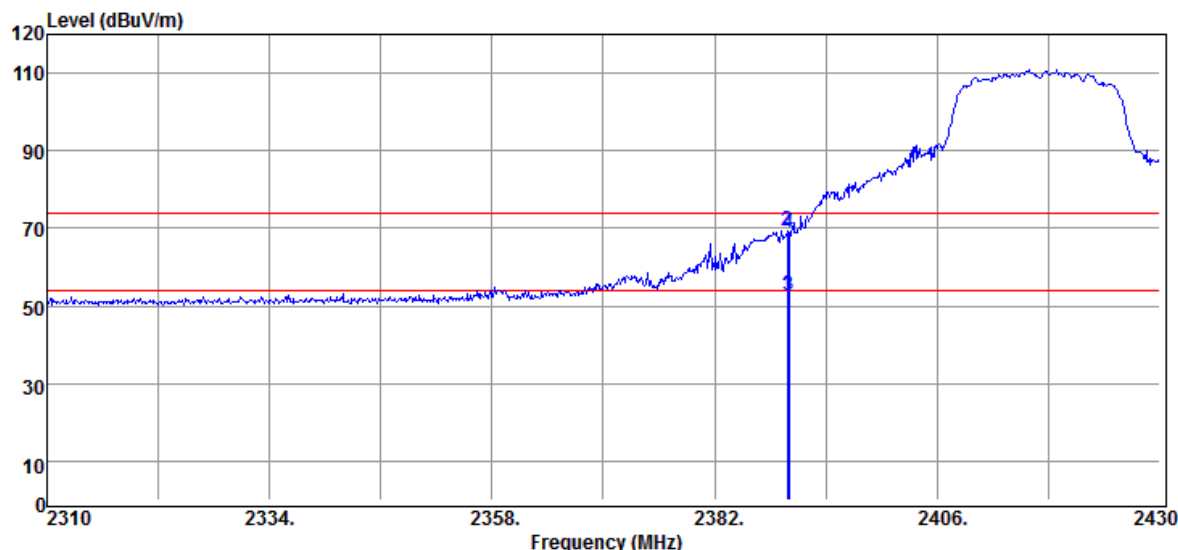
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Operation Mode	:802.11n20	Test Date	:2018-07-12
Test Mode	:BE CH LOW	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2417 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.80	Average	49.17	3.39	52.56	54.00	-1.44
2389.80	Peak	66.09	3.39	69.48	74.00	-4.52
2390.00	Average	49.47	3.39	52.86	54.00	-1.14
2390.00	Peak	65.71	3.39	69.10	74.00	-4.90

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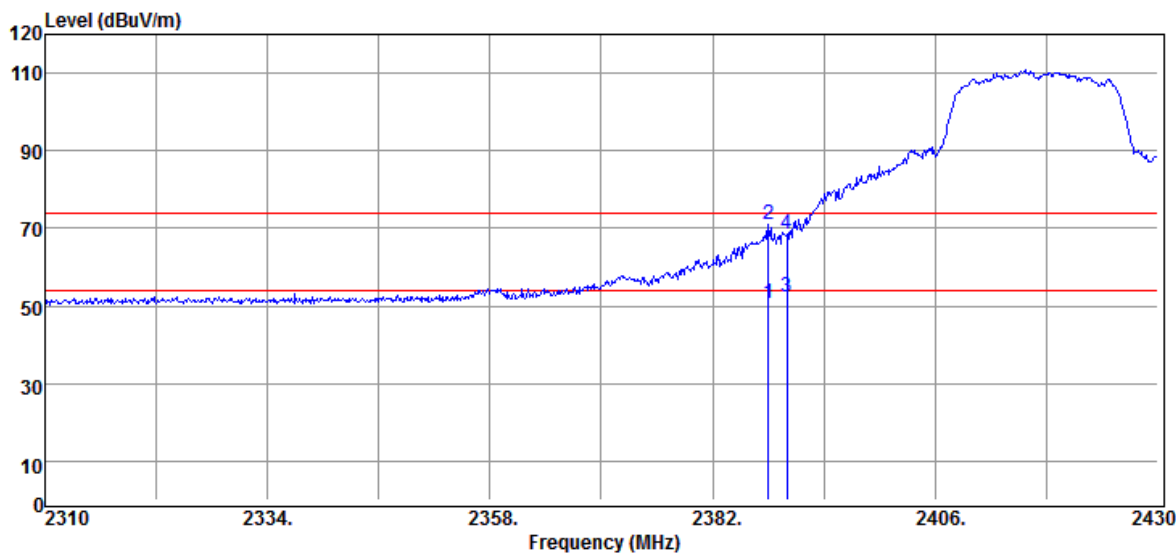
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Operation Mode	:802.11n20	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2417 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2388.00	Average	47.28	3.38	50.66	54.00	-3.34
2388.00	Peak	67.71	3.38	71.09	74.00	-2.91
2390.00	Average	49.07	3.39	52.46	54.00	-1.54
2390.00	Peak	65.11	3.39	68.50	74.00	-5.50

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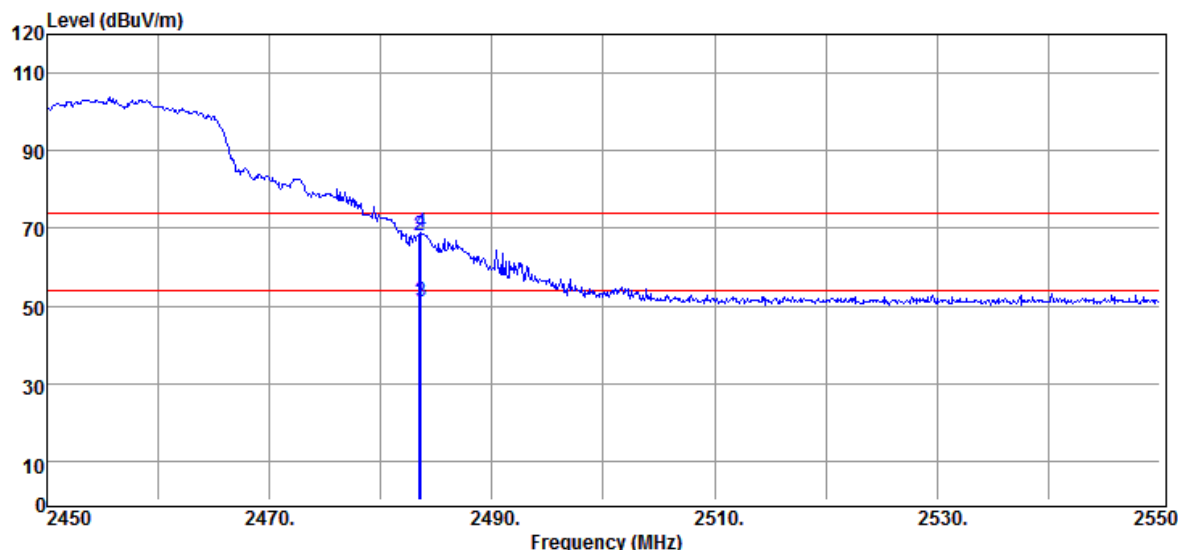
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Operation Mode :802.11n20  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2457 MHz

Test Date :2018-07-10  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	47.09	3.96	51.05	54.00	-2.95
2483.50	Peak	64.30	3.96	68.26	74.00	-5.74
2483.60	Average	47.04	3.96	51.00	54.00	-3.00
2483.60	Peak	64.78	3.96	68.74	74.00	-5.26

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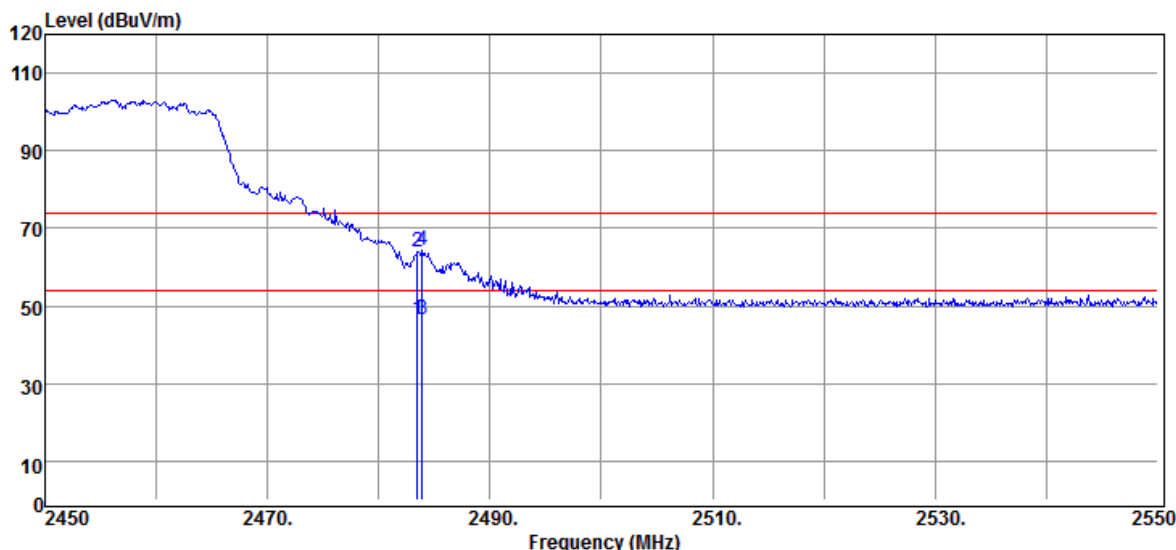
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Operation Mode	:802.11n20	Test Date	:2018-07-10
Test Mode	:BE CH HIGH	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2457 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	42.73	3.96	46.69	54.00	-7.31
2483.50	Peak	59.78	3.96	63.74	74.00	-10.26
2483.90	Average	42.49	3.96	46.45	54.00	-7.55
2483.90	Peak	60.28	3.96	64.24	74.00	-9.76

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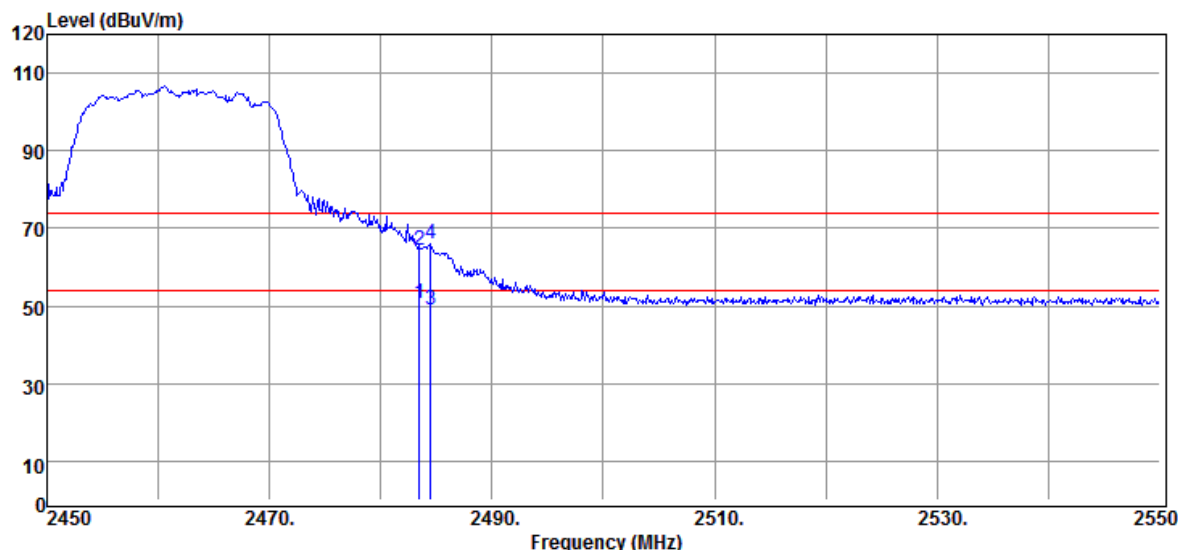
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Operation Mode :802.11n20  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2462 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	46.71	3.96	50.67	54.00	-3.33
2483.50	Peak	60.25	3.96	64.21	74.00	-9.79
2484.50	Average	45.14	3.96	49.10	54.00	-4.90
2484.50	Peak	62.24	3.96	66.20	74.00	-7.80

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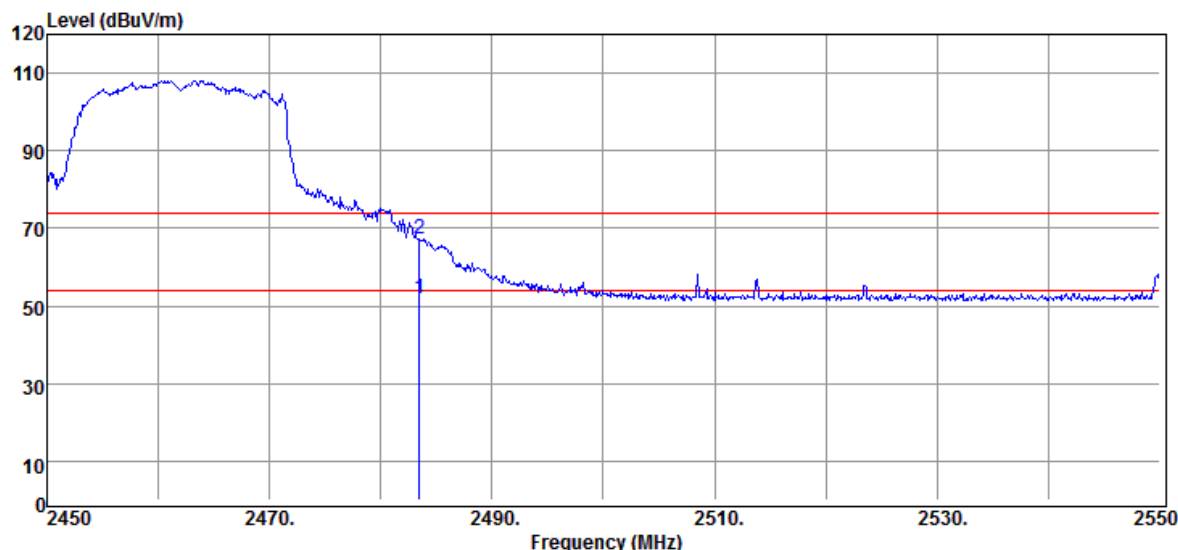
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Operation Mode	:802.11n20	Test Date	:2018-07-10
Test Mode	:BE CH HIGH	Temp./Humi.	:22/69
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	48.03	3.96	51.99	54.00	-2.01
2483.50	Peak	63.35	3.96	67.31	74.00	-6.69

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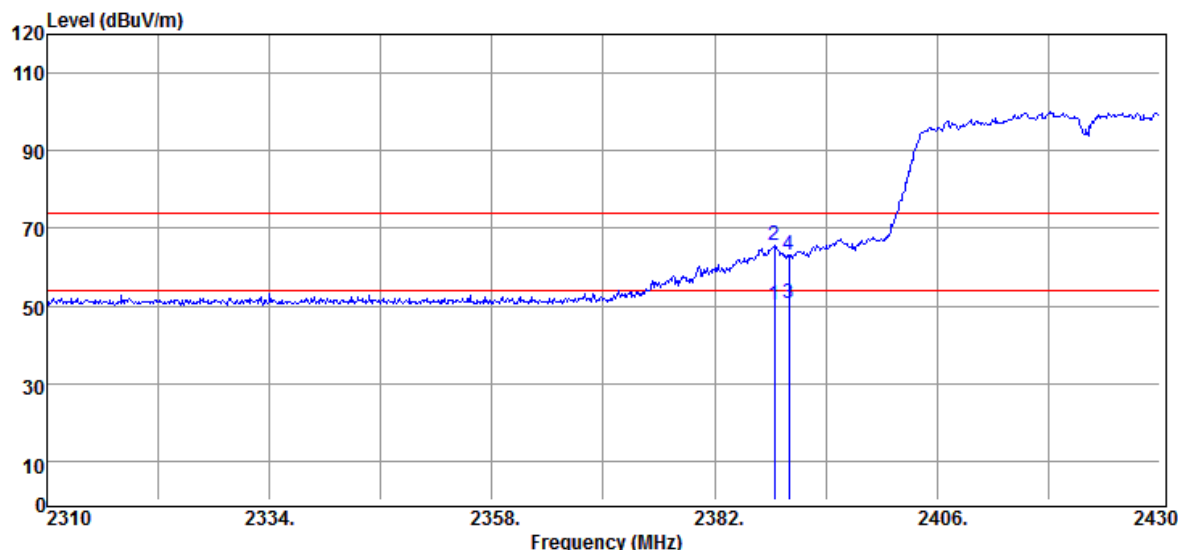
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Operation Mode :802.11n40  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :2422 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2388.48	Average	46.78	3.38	50.16	54.00	-3.84
2388.48	Peak	62.37	3.38	65.75	74.00	-8.25
2390.00	Average	47.27	3.39	50.66	54.00	-3.34
2390.00	Peak	59.75	3.39	63.14	74.00	-10.86

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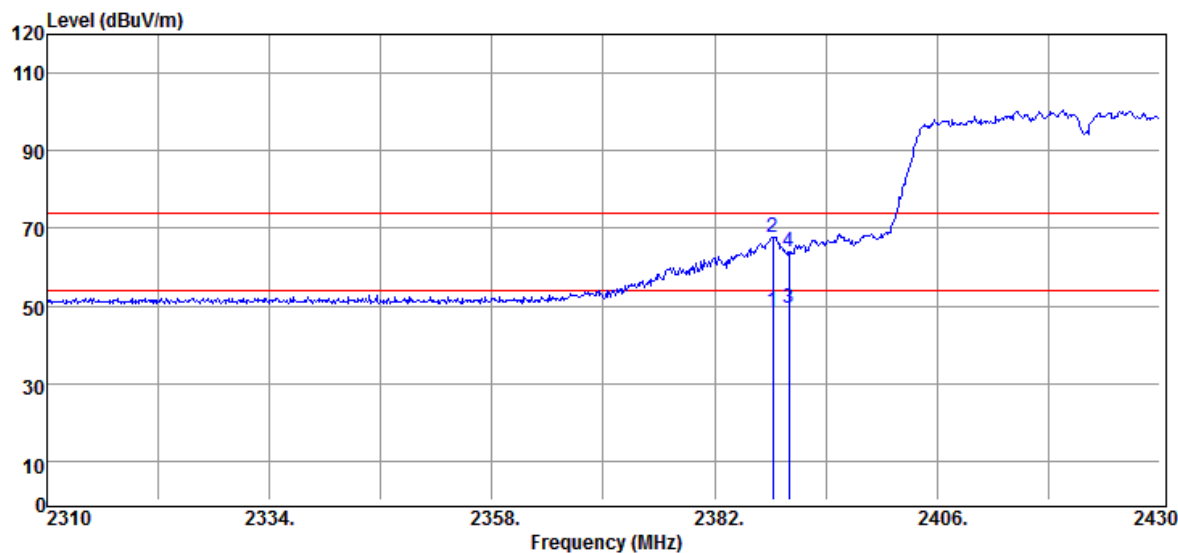
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:22/69
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2422 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2388.24	Average	45.08	3.38	48.46	54.00	-5.54
2388.24	Peak	64.48	3.38	67.86	74.00	-6.14
2390.00	Average	46.08	3.39	49.47	54.00	-4.53
2390.00	Peak	60.56	3.39	63.95	74.00	-10.05

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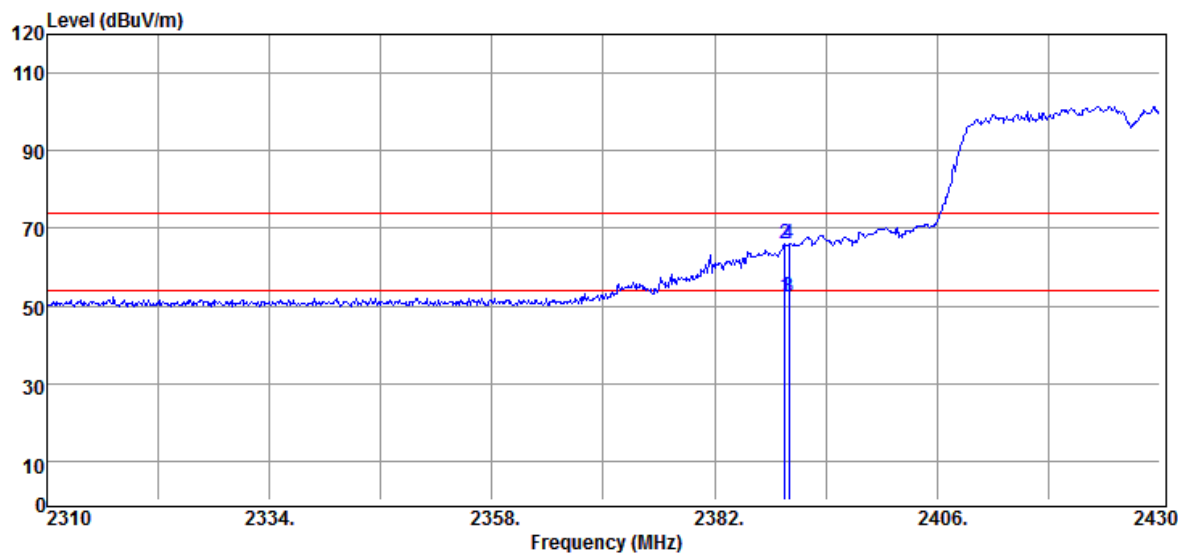
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2427 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.56	Average	49.01	3.40	52.41	54.00	-1.59
2389.56	Peak	62.59	3.40	65.99	74.00	-8.01
2390.00	Average	48.98	3.39	52.37	54.00	-1.63
2390.00	Peak	62.46	3.39	65.85	74.00	-8.15

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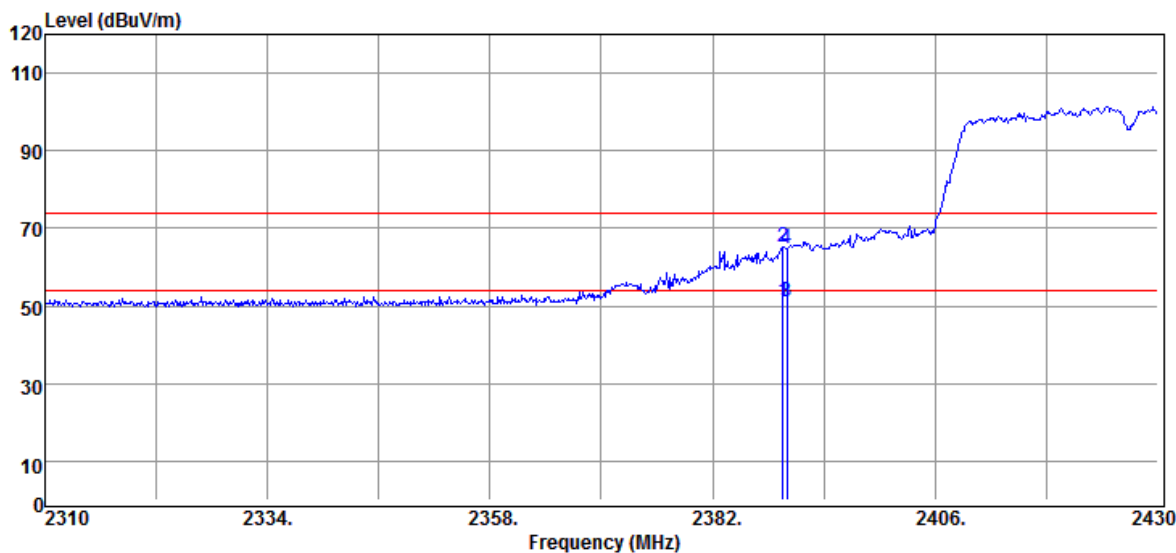
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2427 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.56	Average	47.88	3.40	51.28	54.00	-2.72
2389.56	Peak	61.73	3.40	65.13	74.00	-8.87
2390.00	Average	47.72	3.39	51.11	54.00	-2.89
2390.00	Peak	61.51	3.39	64.90	74.00	-9.10

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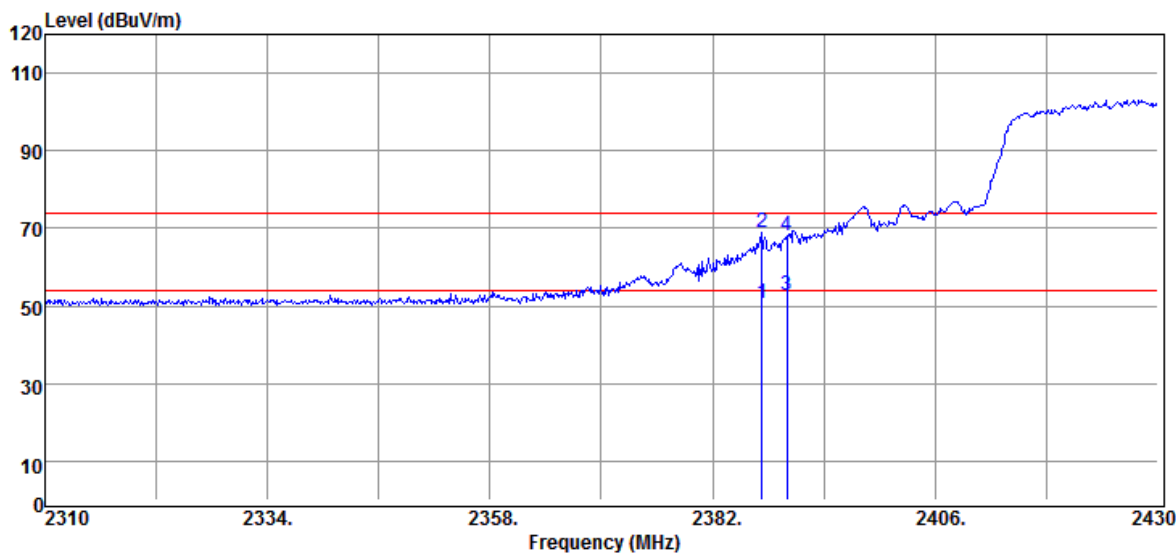
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2432 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2387.28	Average	47.37	3.38	50.75	54.00	-3.25
2387.28	Peak	65.63	3.38	69.01	74.00	-4.99
2390.00	Average	49.38	3.39	52.77	54.00	-1.23
2390.00	Peak	64.69	3.39	68.08	74.00	-5.92

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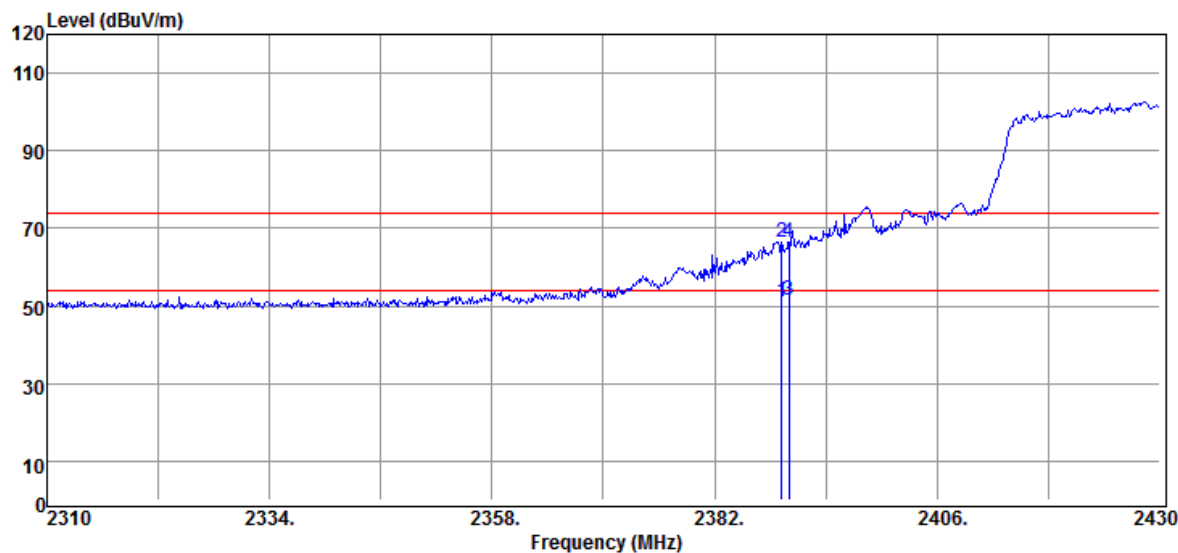
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH LOW	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2432 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.20	Average	47.81	3.39	51.20	54.00	-2.80
2389.20	Peak	63.24	3.39	66.63	74.00	-7.37
2390.00	Average	48.18	3.39	51.57	54.00	-2.43
2390.00	Peak	63.07	3.39	66.46	74.00	-7.54

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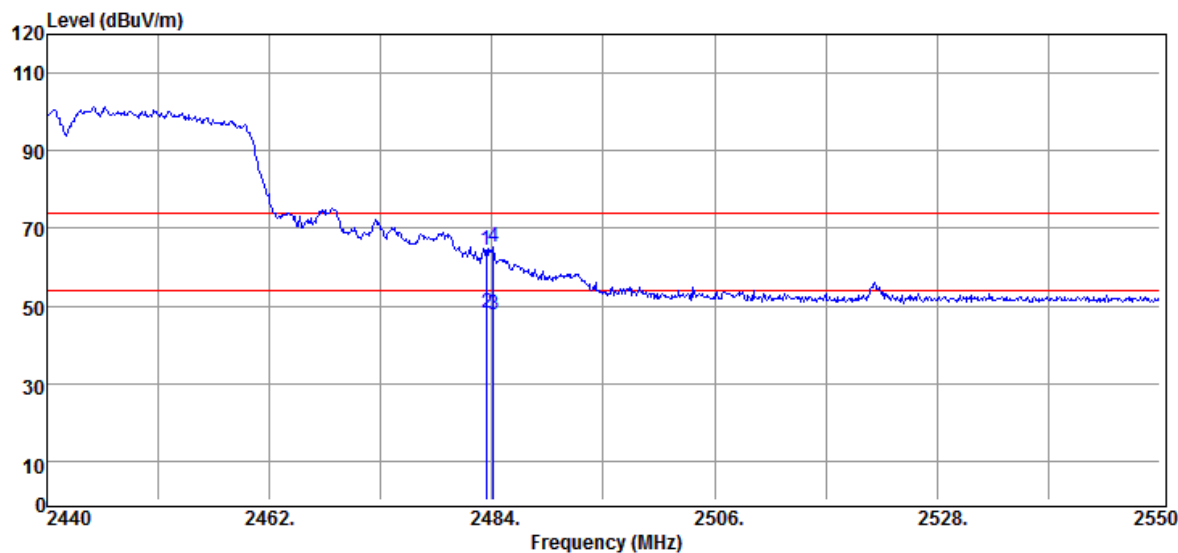
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Operation Mode :802.11n40  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2442MHz

Test Date :2018-07-10  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.45	Peak	60.20	3.96	64.16	74.00	-9.84
2483.50	Average	44.25	3.96	48.21	54.00	-5.79
2484.11	Average	43.87	3.96	47.83	54.00	-6.17
2484.11	Peak	61.25	3.96	65.21	74.00	-8.79

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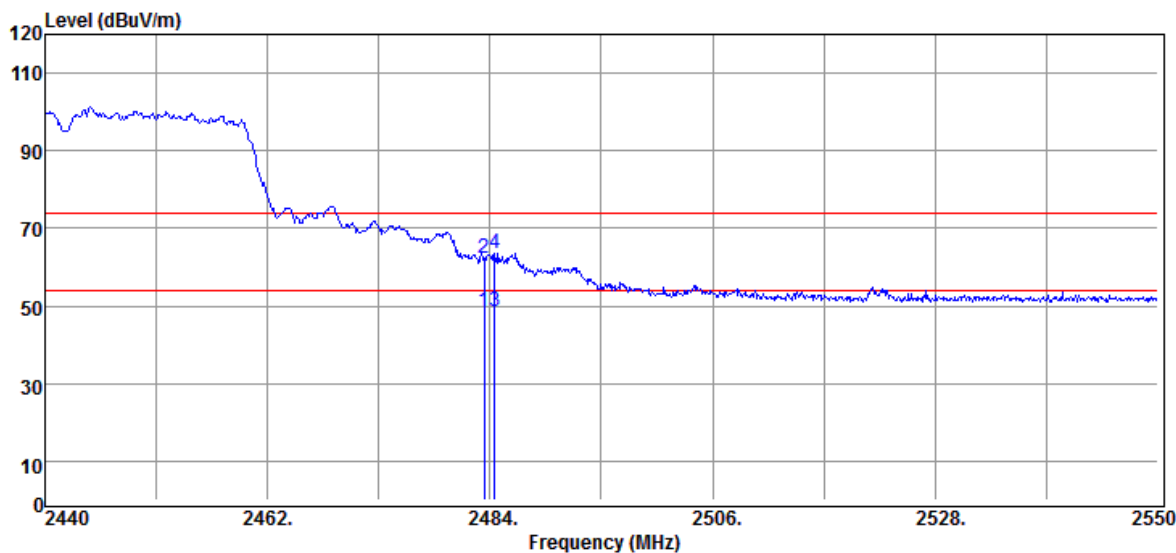
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH HIGH	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2442MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.45	Average	44.65	3.96	48.61	54.00	-5.39
2483.45	Peak	58.37	3.96	62.33	74.00	-11.67
2484.44	Average	44.62	3.96	48.58	54.00	-5.42
2484.44	Peak	59.53	3.96	63.49	74.00	-10.51

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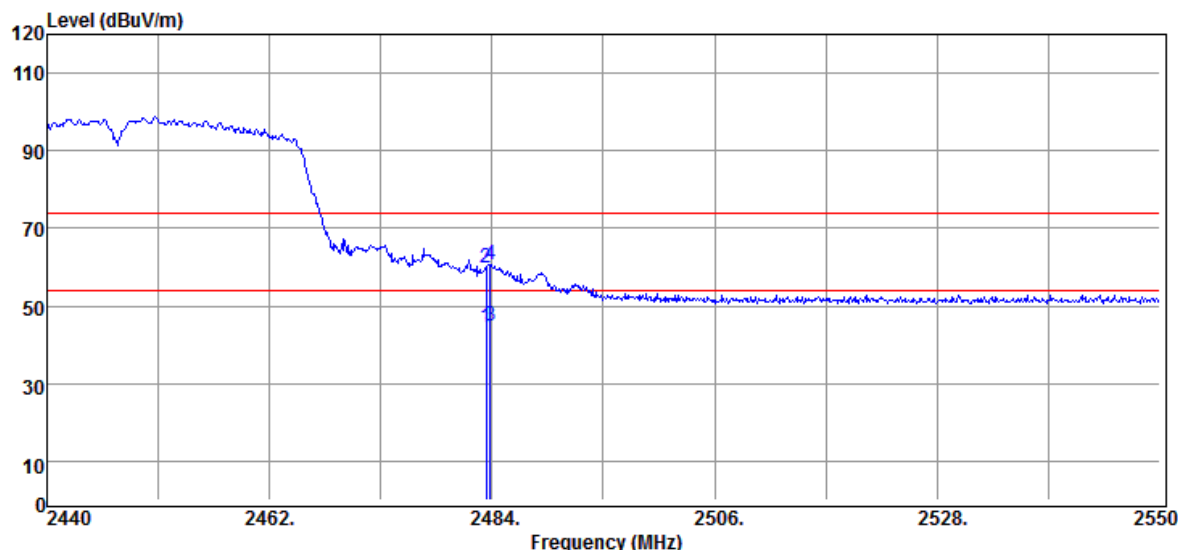
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Operation Mode :802.11n40  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2447 MHz

Test Date :2018-07-10  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.45	Average	40.62	3.96	44.58	54.00	-9.42
2483.45	Peak	55.86	3.96	59.82	74.00	-14.18
2483.78	Average	40.68	3.96	44.64	54.00	-9.36
2483.78	Peak	56.87	3.96	60.83	74.00	-13.17

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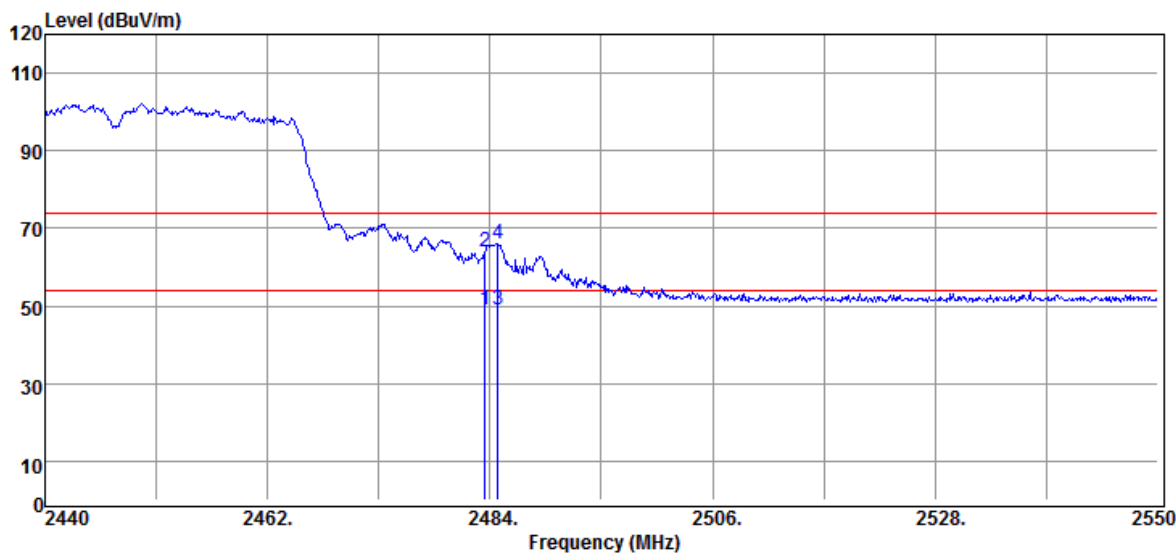
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH HIGH	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2447 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	45.04	3.96	49.00	54.00	-5.00
2483.50	Peak	59.89	3.96	63.85	74.00	-10.15
2484.77	Average	45.20	3.96	49.16	54.00	-4.84
2484.77	Peak	61.94	3.96	65.90	74.00	-8.10

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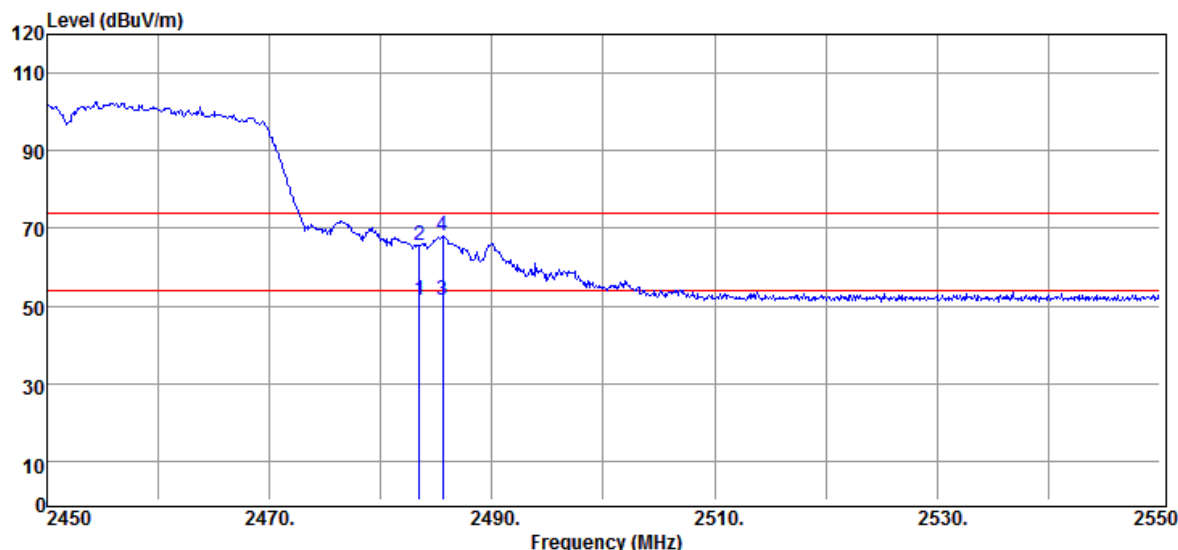
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Operation Mode :802.11n40  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :2452 MHz

Test Date :2018-07-10  
Temp./Humi. :22/69  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	47.42	3.96	51.38	54.00	-2.62
2483.50	Peak	61.55	3.96	65.51	74.00	-8.49
2485.60	Average	47.41	3.98	51.39	54.00	-2.61
2485.60	Peak	64.06	3.98	68.04	74.00	-5.96

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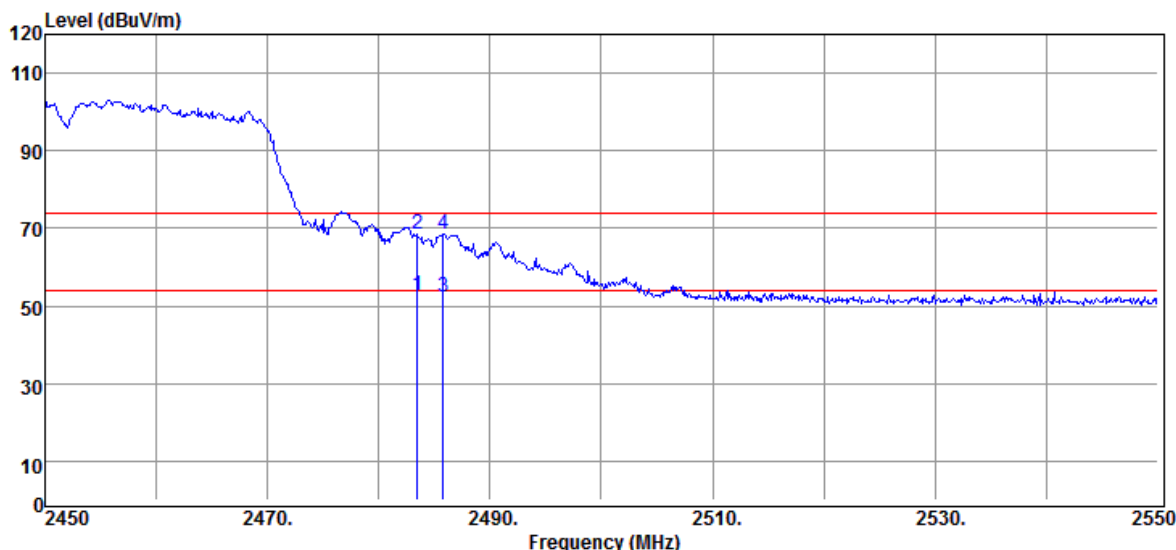
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Operation Mode	:802.11n40	Test Date	:2018-07-10
Test Mode	:BE CH HIGH	Temp./Humi.	:22/69
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2452 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	48.91	3.96	52.87	54.00	-1.13
2483.50	Peak	64.35	3.96	68.31	74.00	-5.69
2485.80	Average	48.32	3.98	52.30	54.00	-1.70
2485.80	Peak	64.45	3.98	68.43	74.00	-5.57

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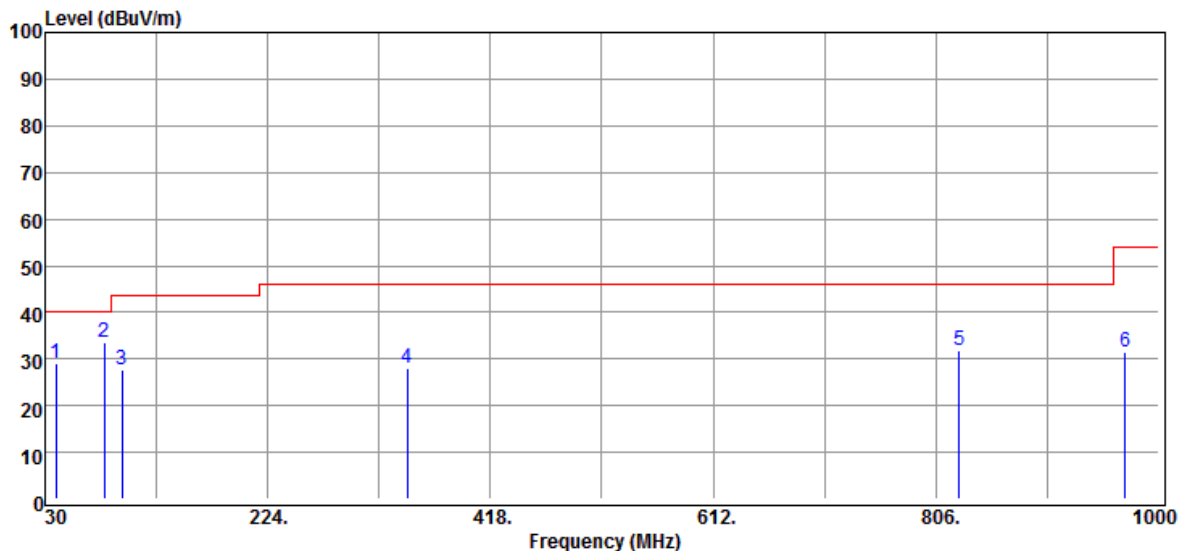
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## Below 1GHz Worst-Case Data: Radiated Spurious Emission Measurement Result

Operation Mode	:802.11g	Test Date	:2018-07-22
Test Mode	:TX CH LOW	Temp./Humi.	:26/58
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
39.70	Peak	37.45	-8.50	28.95	40.00	-11.05
81.41	Peak	50.52	-16.79	33.73	40.00	-6.27
96.93	Peak	43.07	-15.26	27.81	43.50	-15.69
345.25	Peak	36.16	-8.13	28.03	46.00	-17.97
826.37	Peak	31.69	0.23	31.92	46.00	-14.08
970.90	Peak	29.08	2.57	31.65	54.00	-22.35

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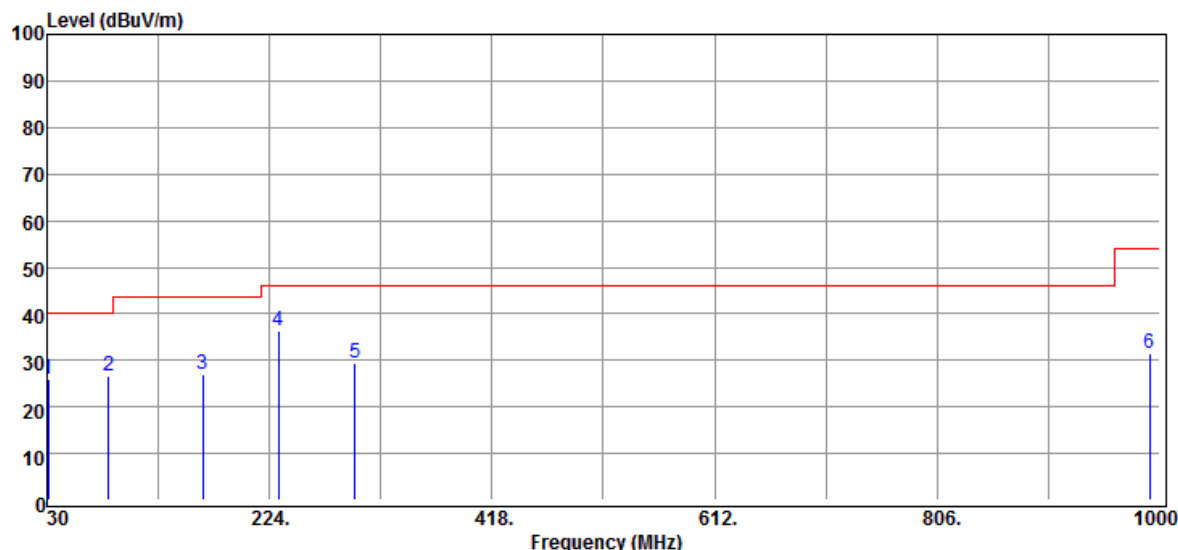
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Operation Mode :802.11g  
Test Mode :TX CH LOW  
EUT Pol :H Plan  
Test Channel :2412 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
30.97	Peak	30.20	-4.16	26.04	40.00	-13.96
83.35	Peak	43.28	-16.70	26.58	40.00	-13.42
165.80	Peak	40.65	-13.67	26.98	43.50	-16.52
231.76	Peak	48.61	-12.32	36.29	46.00	-9.71
298.69	Peak	39.26	-9.93	29.33	46.00	-16.67
991.27	Peak	28.29	3.09	31.38	54.00	-22.62

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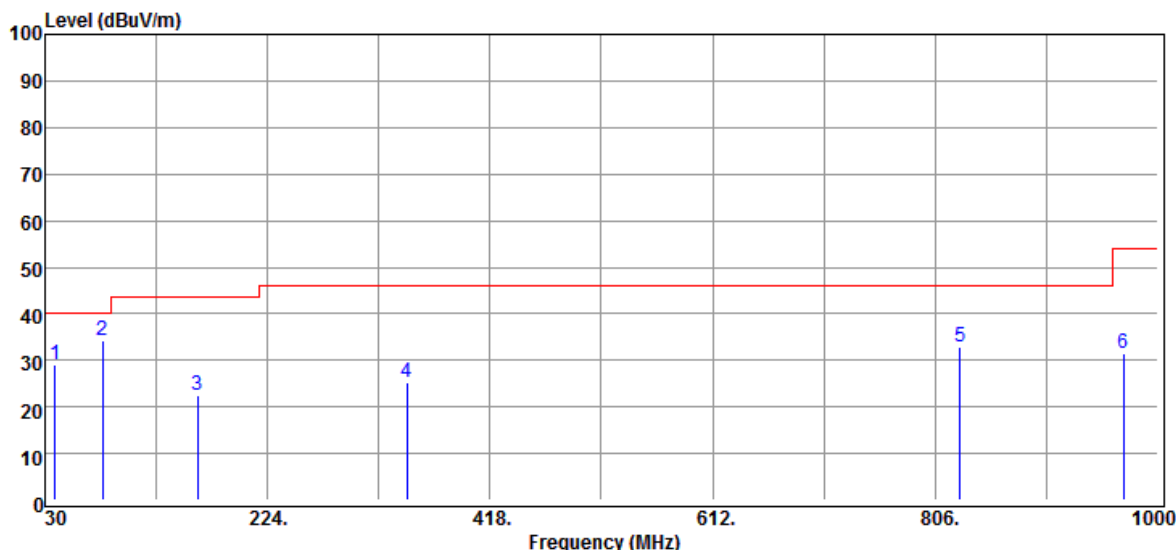
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Operation Mode :802.11g  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
38.73	Peak	37.02	-8.07	28.95	40.00	-11.05
80.44	Peak	50.06	-16.84	33.22	40.00	-6.78
162.89	Peak	35.83	-13.45	22.38	43.50	-21.12
345.25	Peak	33.55	-8.13	25.42	46.00	-20.58
827.34	Peak	32.52	0.25	32.77	46.00	-13.23
969.93	Peak	29.11	2.55	31.66	54.00	-22.34

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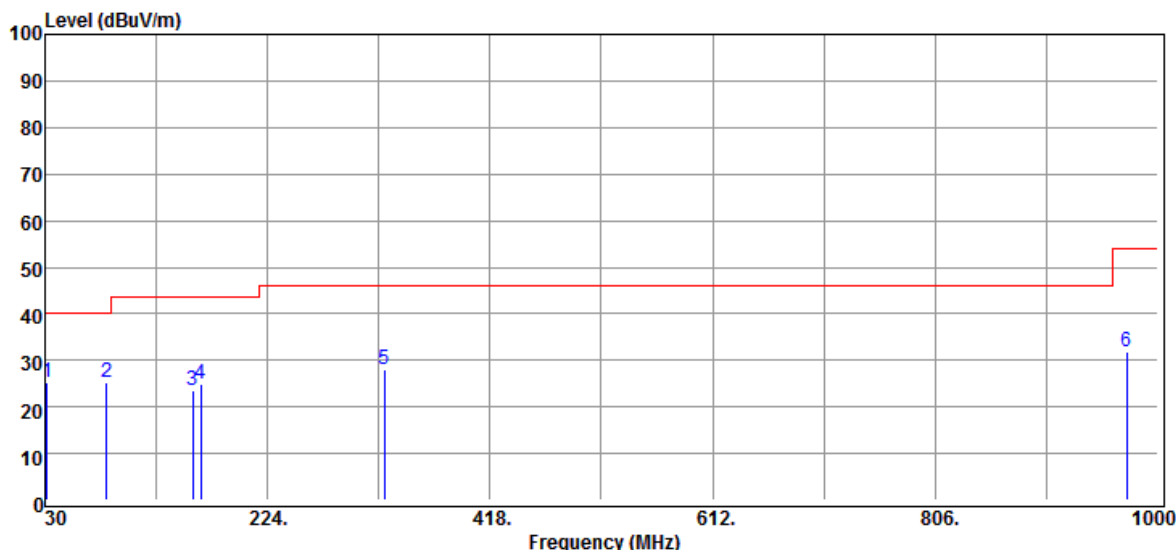
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Operation Mode :802.11g  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
31.94	Peak	30.07	-4.71	25.36	40.00	-14.64
83.35	Peak	42.10	-16.70	25.40	40.00	-14.60
159.01	Peak	36.72	-13.18	23.54	43.50	-19.96
165.80	Peak	38.67	-13.67	25.00	43.50	-18.50
325.85	Peak	37.00	-9.02	27.98	46.00	-18.02
972.84	Peak	29.05	2.63	31.68	54.00	-22.32

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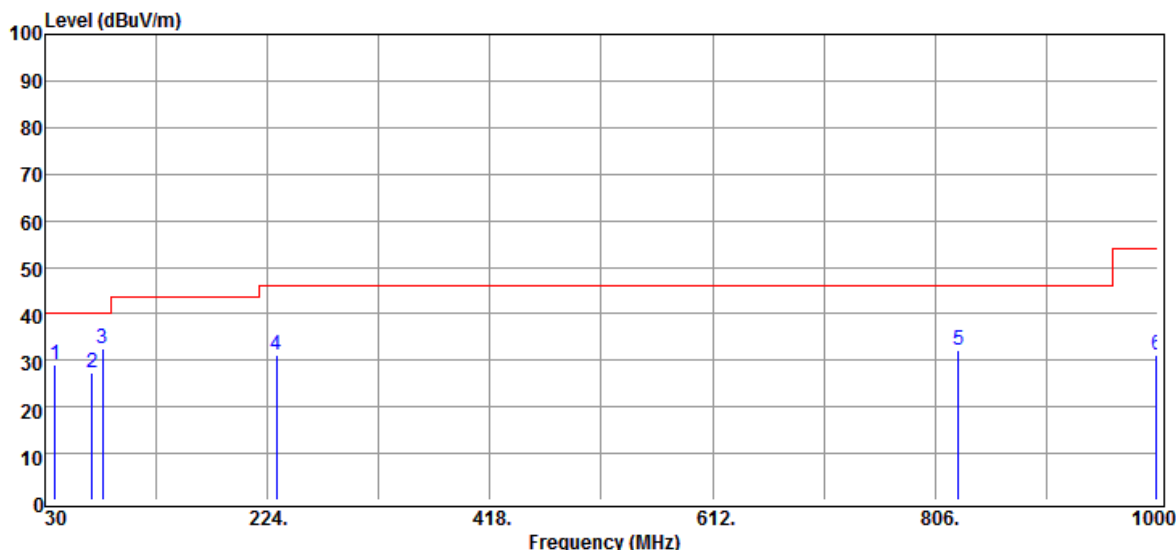
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Operation Mode :802.11g  
Test Mode :TX CH HIGH  
EUT Pol :H Plan  
Test Channel :2462 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
38.73	Peak	37.10	-8.07	29.03	40.00	-10.97
70.74	Peak	45.26	-17.82	27.44	40.00	-12.56
80.44	Peak	49.46	-16.84	32.62	40.00	-7.38
231.76	Peak	43.55	-12.32	31.23	46.00	-14.77
826.37	Peak	31.93	0.23	32.16	46.00	-13.84
999.03	Peak	28.03	3.28	31.31	54.00	-22.69

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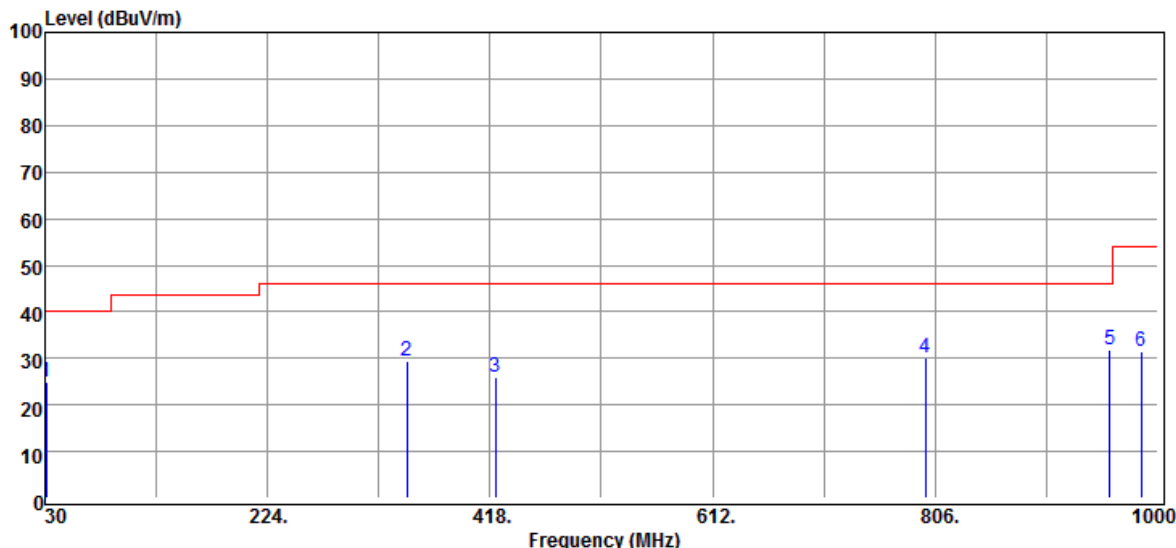
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Operation Mode	:802.11g	Test Date	:2018-07-22
Test Mode	:TX CH HIGH	Temp./Humi.	:26/58
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
30.97	Peak	29.21	-4.16	25.05	40.00	-14.95
345.25	Peak	37.37	-8.13	29.24	46.00	-16.76
422.85	Peak	31.85	-5.87	25.98	46.00	-20.02
797.27	Peak	30.53	-0.38	30.15	46.00	-15.85
958.29	Peak	29.57	2.26	31.83	46.00	-14.17
985.45	Peak	28.38	2.94	31.32	54.00	-22.68

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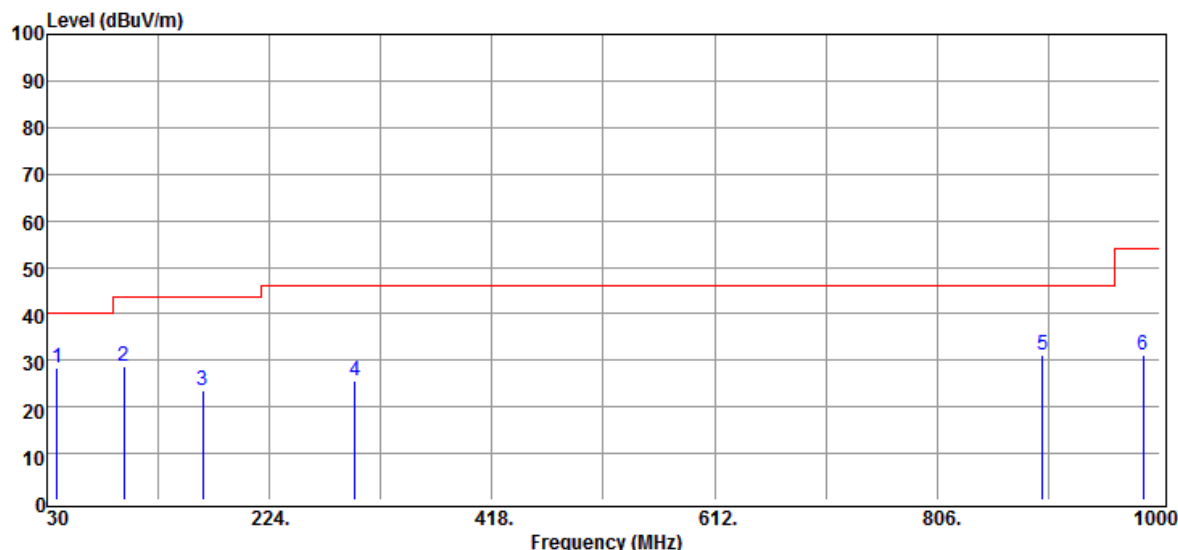
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Operation Mode :802.11n40  
Test Mode :TX CH LOW  
EUT Pol :H Plan  
Test Channel :2422 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
38.73	Peak	36.37	-8.07	28.30	40.00	-11.70
96.93	Peak	44.11	-15.26	28.85	43.50	-14.65
165.80	Peak	37.11	-13.67	23.44	43.50	-20.06
298.69	Peak	35.40	-9.93	25.47	46.00	-20.53
898.15	Peak	29.87	1.16	31.03	46.00	-14.97
985.45	Peak	28.33	2.94	31.27	54.00	-22.73

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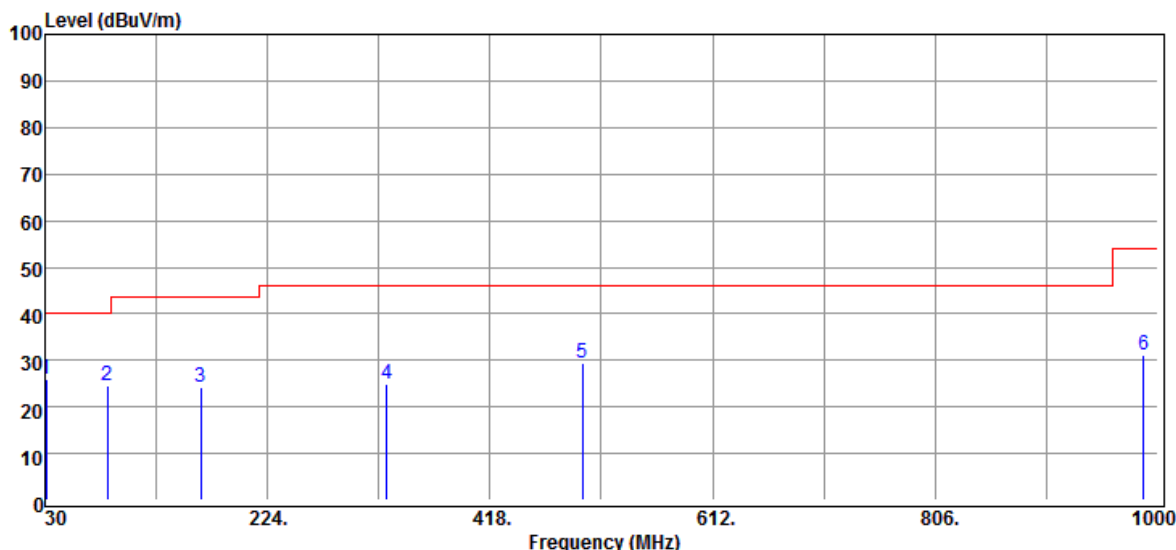
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Operation Mode	:802.11n40	Test Date	:2018-07-22
Test Mode	:TX CH LOW	Temp./Humi.	:26/58
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2422 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
30.97	Peak	30.02	-4.16	25.86	40.00	-14.14
84.32	Peak	41.27	-16.65	24.62	40.00	-15.38
165.80	Peak	37.74	-13.67	24.07	43.50	-19.43
327.79	Peak	33.82	-8.97	24.85	46.00	-21.15
498.51	Peak	33.71	-4.24	29.47	46.00	-16.53
987.39	Peak	28.08	2.99	31.07	54.00	-22.93

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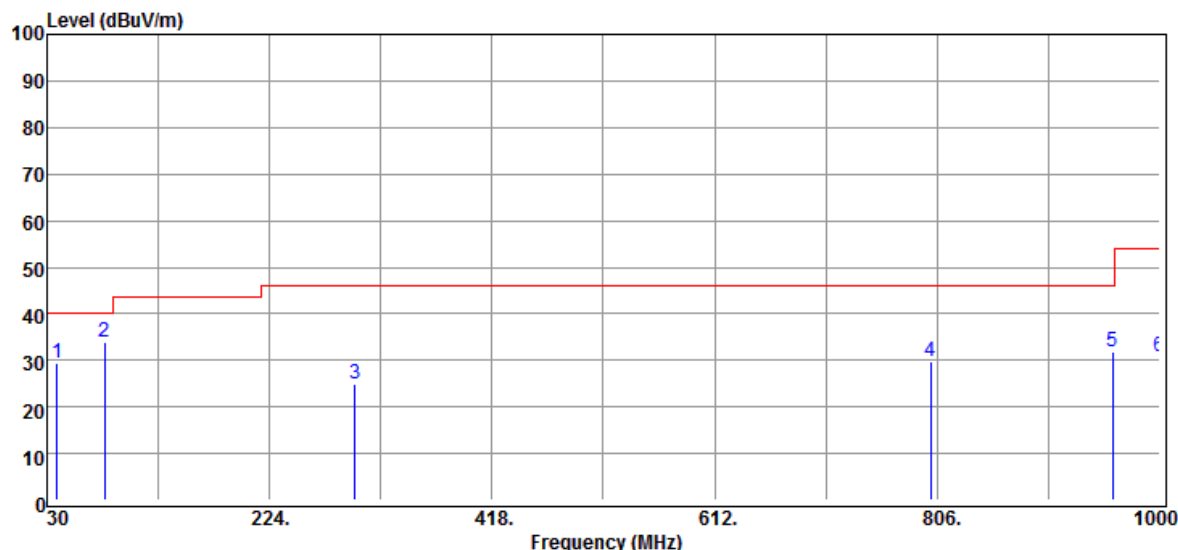
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Operation Mode :802.11n40  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
38.73	Peak	37.61	-8.07	29.54	40.00	-10.46
80.44	Peak	50.61	-16.84	33.77	40.00	-6.23
298.69	Peak	34.79	-9.93	24.86	46.00	-21.14
800.18	Peak	30.13	-0.33	29.80	46.00	-16.20
959.26	Peak	29.55	2.28	31.83	46.00	-14.17
1000.00	Peak	27.55	3.30	30.85	54.00	-23.15

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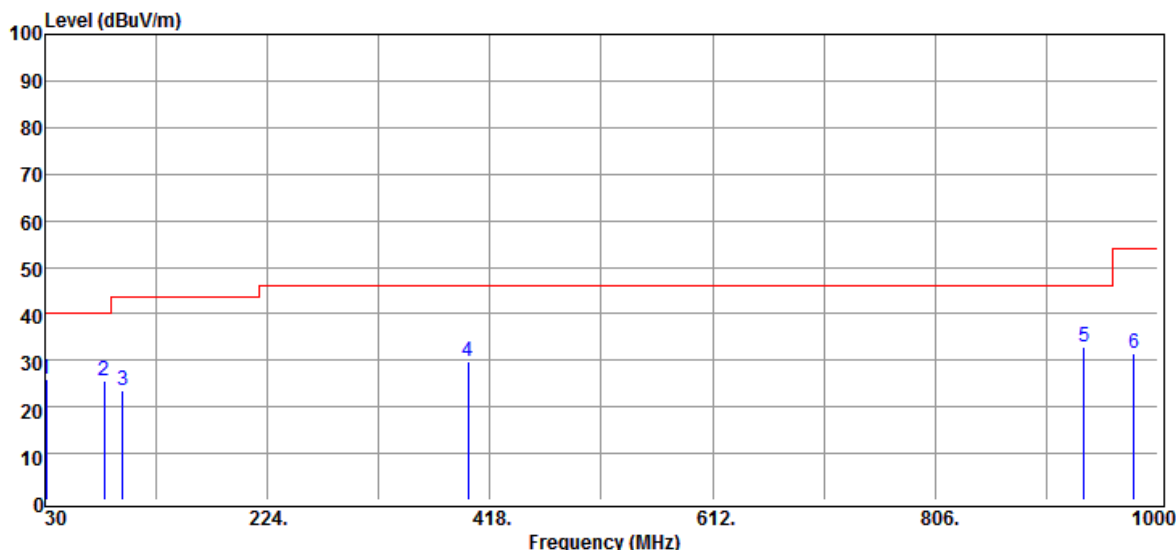
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Operation Mode :802.11n40  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
30.97	Peak	30.03	-4.16	25.87	40.00	-14.13
81.41	Peak	42.43	-16.79	25.64	40.00	-14.36
97.90	Peak	38.57	-15.10	23.47	43.50	-20.03
398.60	Peak	35.69	-6.07	29.62	46.00	-16.38
935.98	Peak	31.08	1.81	32.89	46.00	-13.11
979.63	Peak	28.76	2.80	31.56	54.00	-22.44

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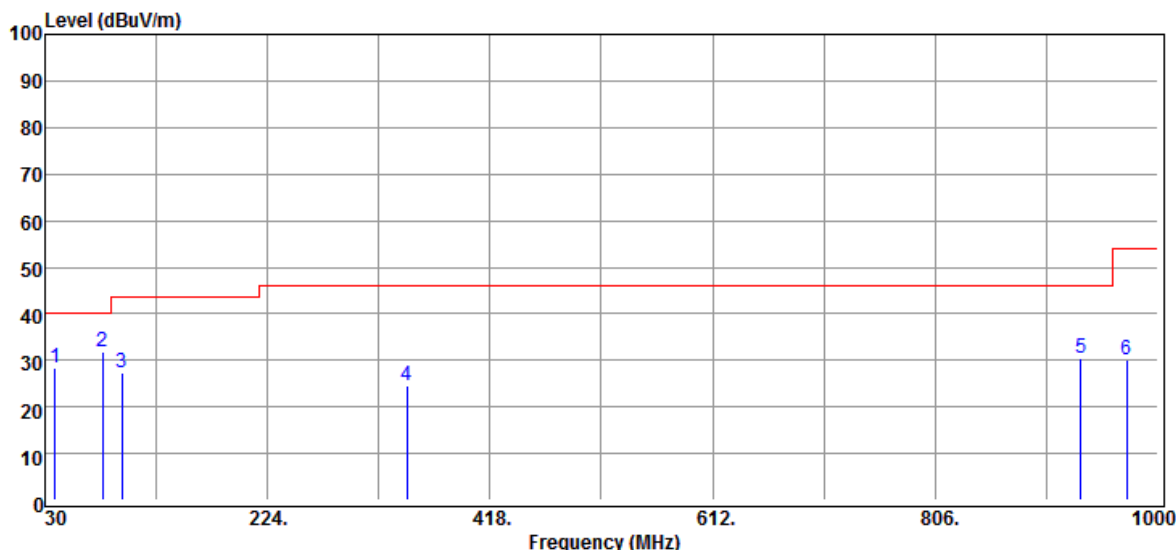
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Operation Mode :802.11n40  
Test Mode :TX CH HIGH  
EUT Pol :H Plan  
Test Channel :2452 MHz

Test Date :2018-07-22  
Temp./Humi. :26/58  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
38.73	Peak	36.39	-8.07	28.32	40.00	-11.68
80.44	Peak	48.76	-16.84	31.92	40.00	-8.08
96.93	Peak	42.44	-15.26	27.18	43.50	-16.32
345.25	Peak	32.76	-8.13	24.63	46.00	-21.37
933.07	Peak	28.76	1.76	30.52	46.00	-15.48
972.84	Peak	27.55	2.63	30.18	54.00	-23.82

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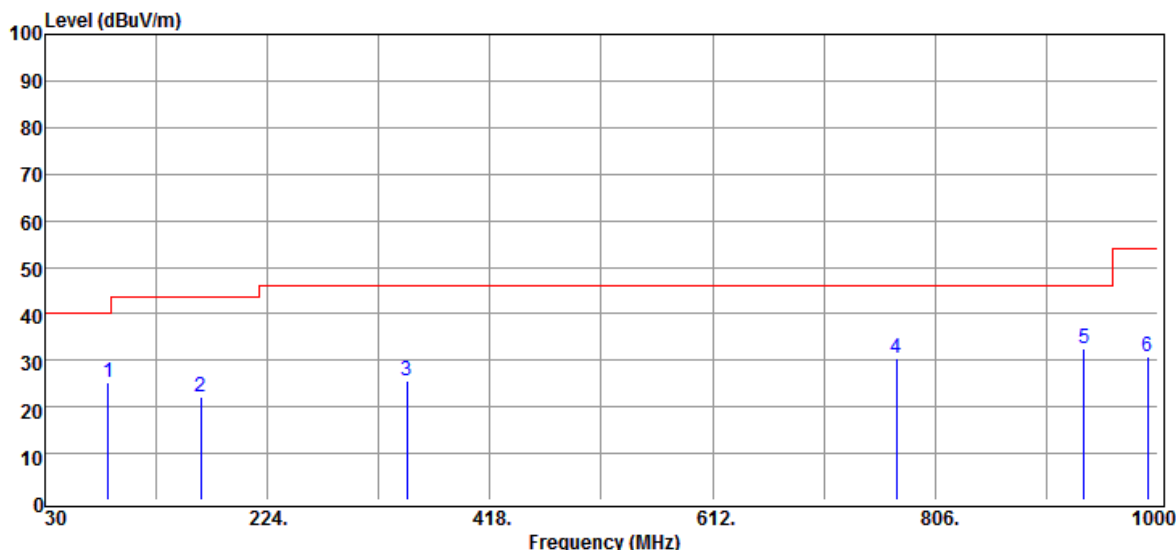
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Operation Mode	:802.11n40	Test Date	:2018-07-22
Test Mode	:TX CH HIGH	Temp./Humi.	:26/58
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2452 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
85.29	Peak	41.81	-16.60	25.21	40.00	-14.79
165.80	Peak	35.90	-13.67	22.23	43.50	-21.27
345.25	Peak	33.85	-8.13	25.72	46.00	-20.28
772.05	Peak	31.20	-0.90	30.30	46.00	-15.70
935.98	Peak	30.57	1.81	32.38	46.00	-13.62
991.27	Peak	27.61	3.09	30.70	54.00	-23.30

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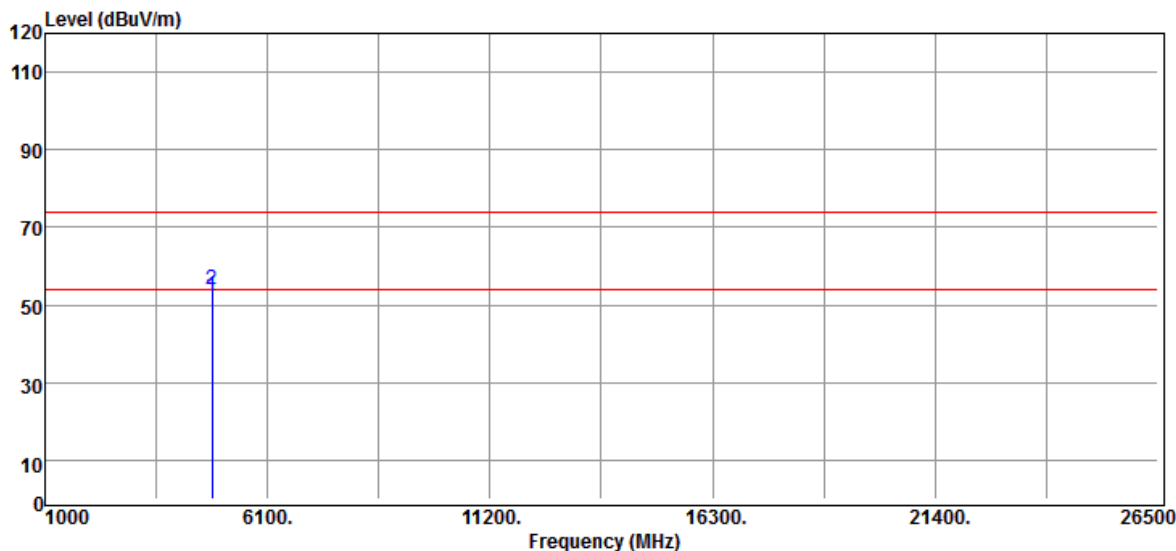
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## Above 1GHz Data:

### Radiated Spurious Emission Measurement Result

Operation Mode	:802.11b	Test Date	:2018-07-24
Test Mode	:TX CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
4824.00	Average	39.88	12.38	52.26	54.00	-1.74
4824.00	Peak	41.56	12.38	53.94	74.00	-20.06

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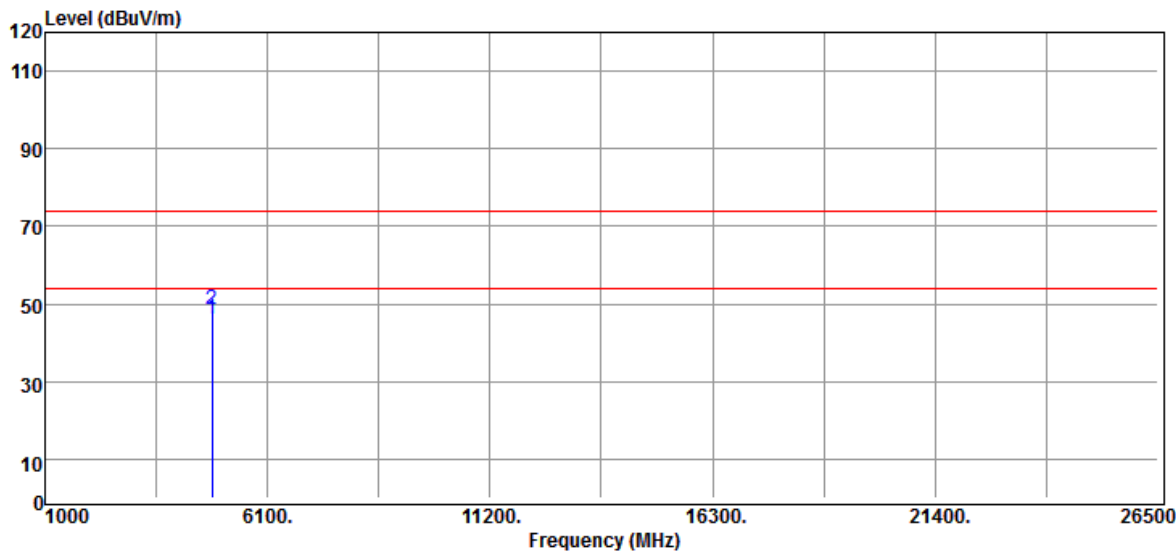
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Operation Mode	:802.11b	Test Date	:2018-07-24
Test Mode	:TX CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4824.00	Average	33.62	12.38	46.00	54.00	-8.00
4824.00	Peak	36.21	12.38	48.59	74.00	-25.41

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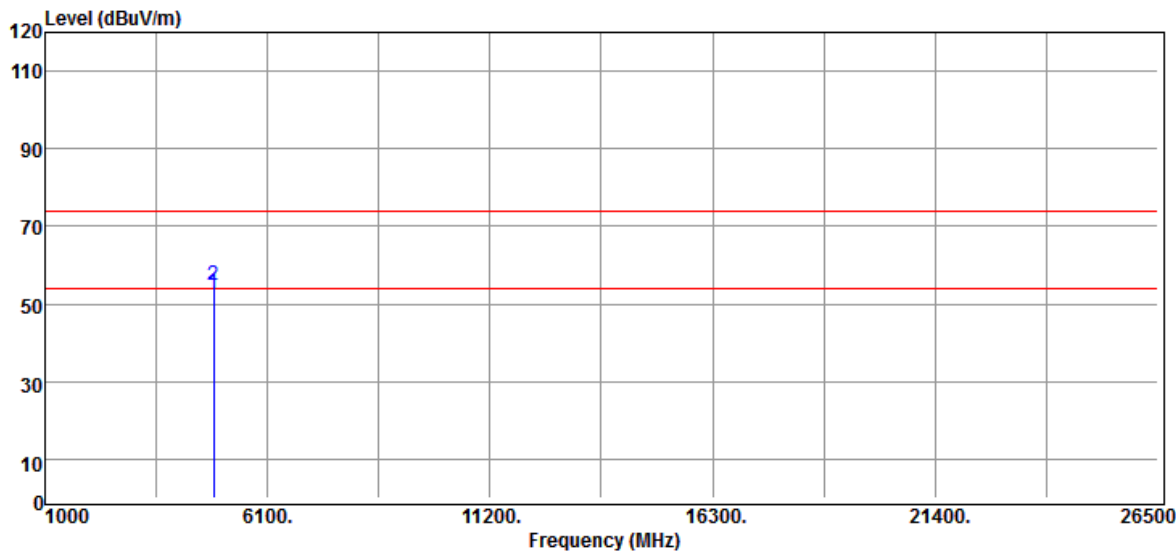
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Operation Mode	:802.11b	Test Date	:2018-07-24
Test Mode	:TX CH MID	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2437 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
4874.00	Average	40.24	12.58	52.82	54.00	-1.18
4874.00	Peak	42.04	12.58	54.62	74.00	-19.38

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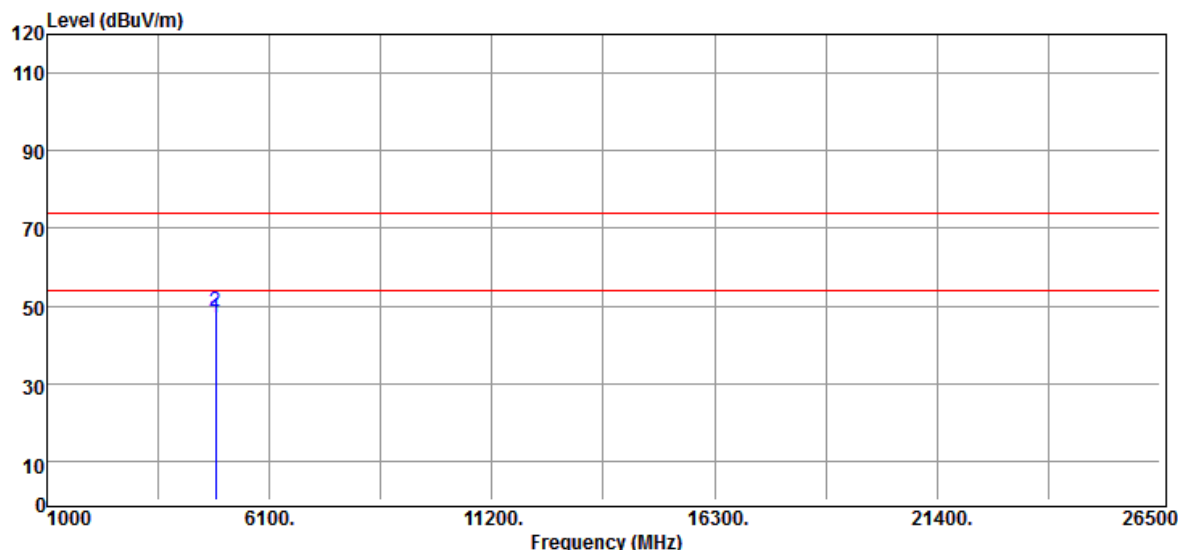
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Operation Mode :802.11b  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-24  
Temp./Humi. :23/61  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	34.24	12.58	46.82	54.00	-7.18
4874.00	Peak	36.16	12.58	48.74	74.00	-25.26

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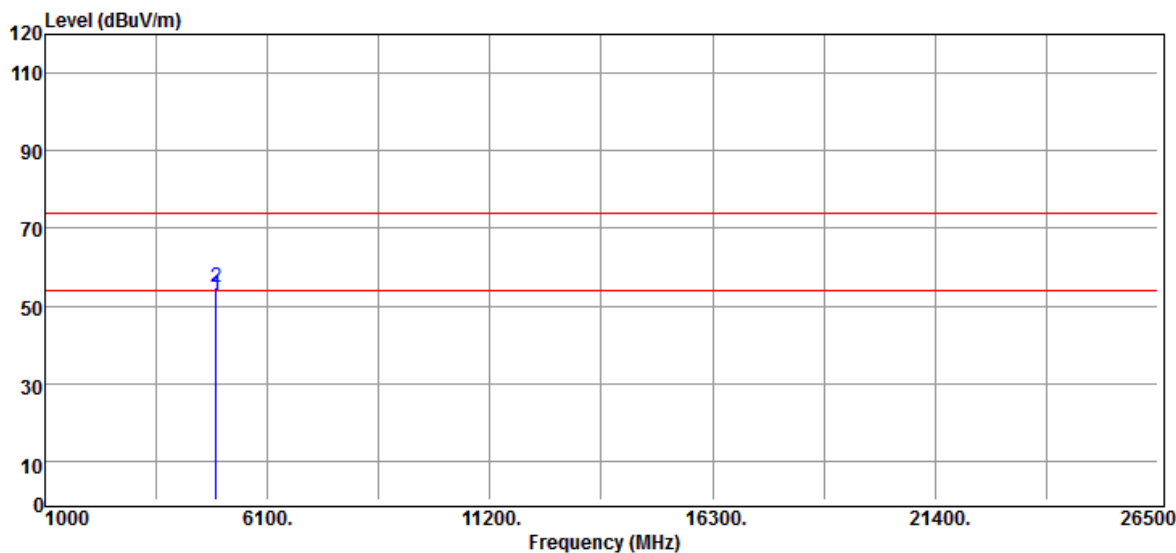
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Operation Mode	:802.11b	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4924.00	Average	39.90	12.78	52.68	54.00	-1.32
4924.00	Peak	42.14	12.78	54.92	74.00	-19.08

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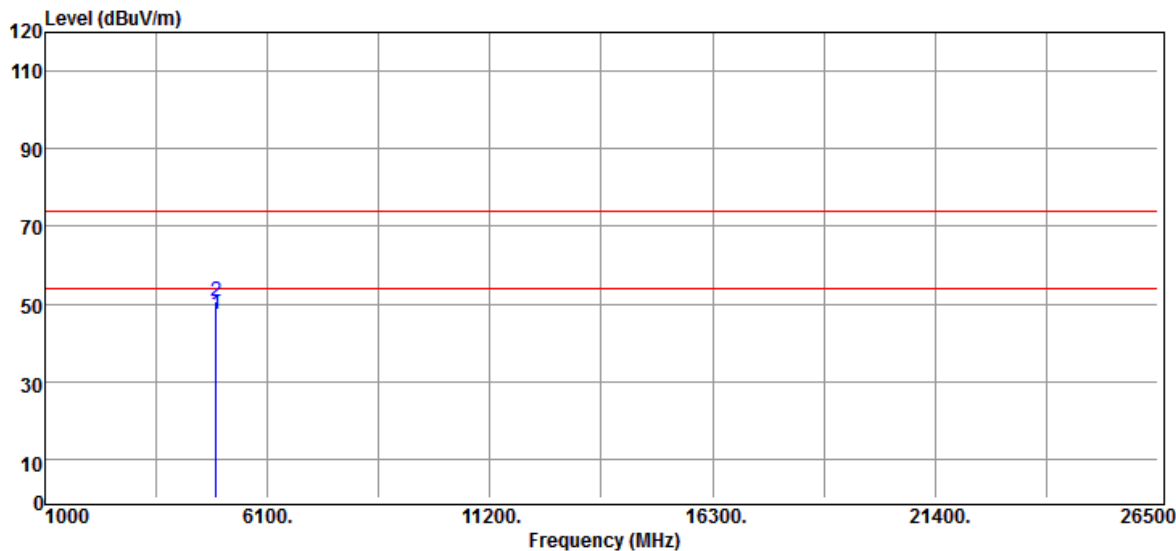
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Operation Mode	:802.11b	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2462 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4924.00	Average	34.50	12.78	47.28	54.00	-6.72
4924.00	Peak	37.76	12.78	50.54	74.00	-23.46

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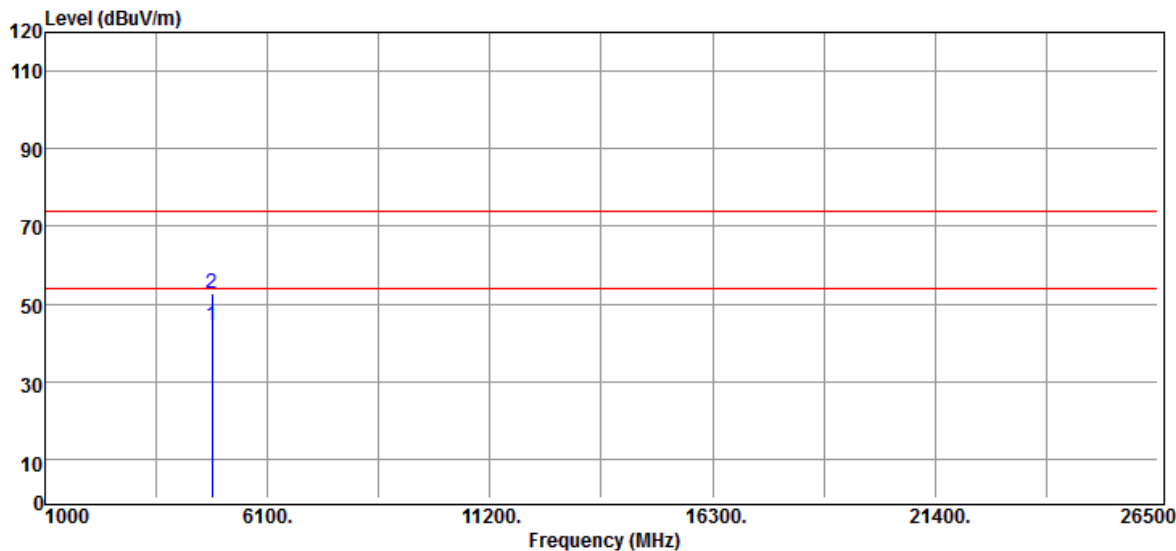
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Operation Mode	:802.11g	Test Date	:2018-07-24
Test Mode	:TX CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4824.00	Average	32.12	12.38	44.50	54.00	-9.50
4824.00	Peak	40.43	12.38	52.81	74.00	-21.19

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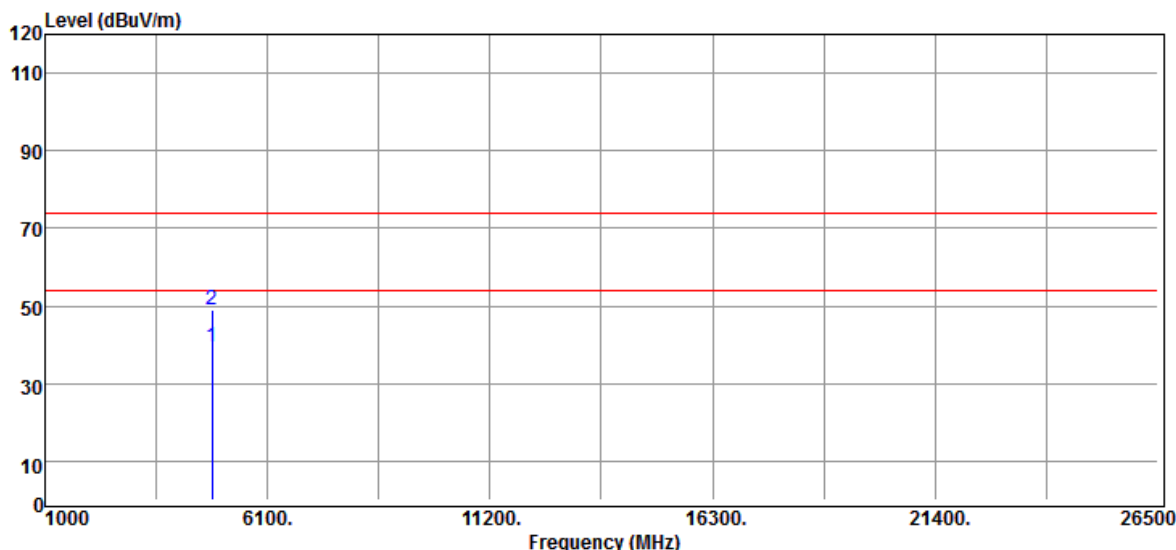
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Operation Mode :802.11g  
Test Mode :TX CH LOW  
EUT Pol :H Plan  
Test Channel :2412 MHz

Test Date :2018-07-24  
Temp./Humi. :23/61  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4824.00	Average	27.14	12.38	39.52	54.00	-14.48
4824.00	Peak	36.42	12.38	48.80	74.00	-25.20

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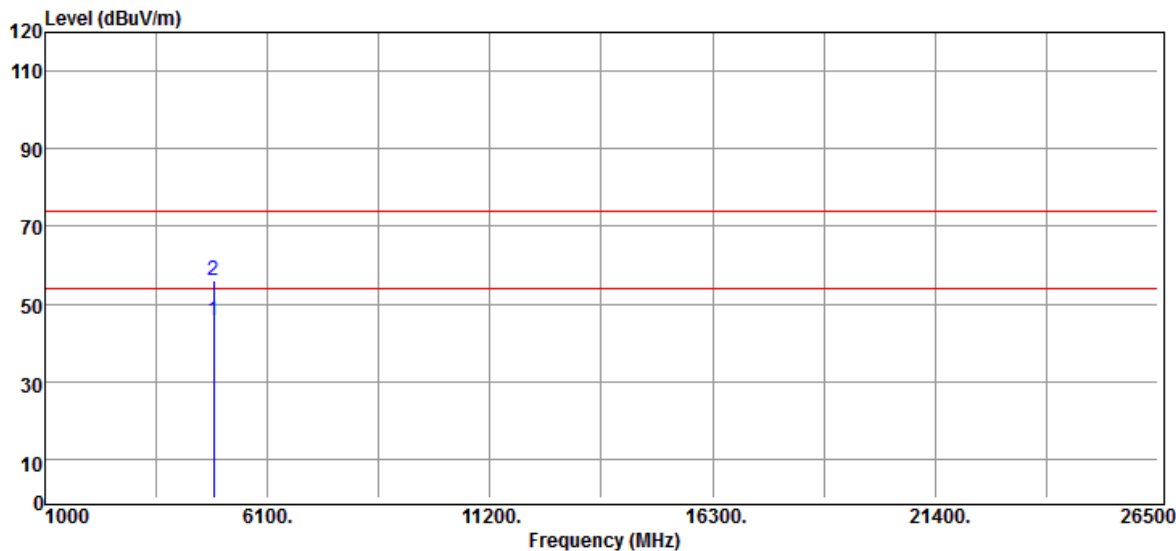
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Operation Mode	:802.11g	Test Date	:2018-07-24
Test Mode	:TX CH MID	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2437 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	33.06	12.58	45.64	54.00	-8.36
4874.00	Peak	43.44	12.58	56.02	74.00	-17.98

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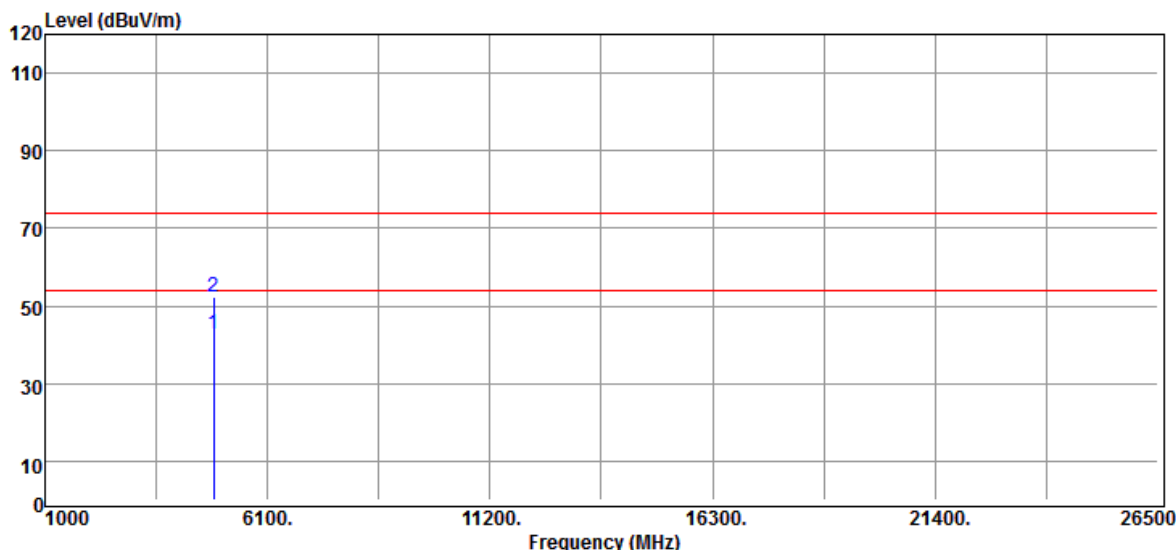
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Operation Mode :802.11g  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-24  
Temp./Humi. :23/61  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	30.09	12.58	42.67	54.00	-11.33
4874.00	Peak	39.55	12.58	52.13	74.00	-21.87

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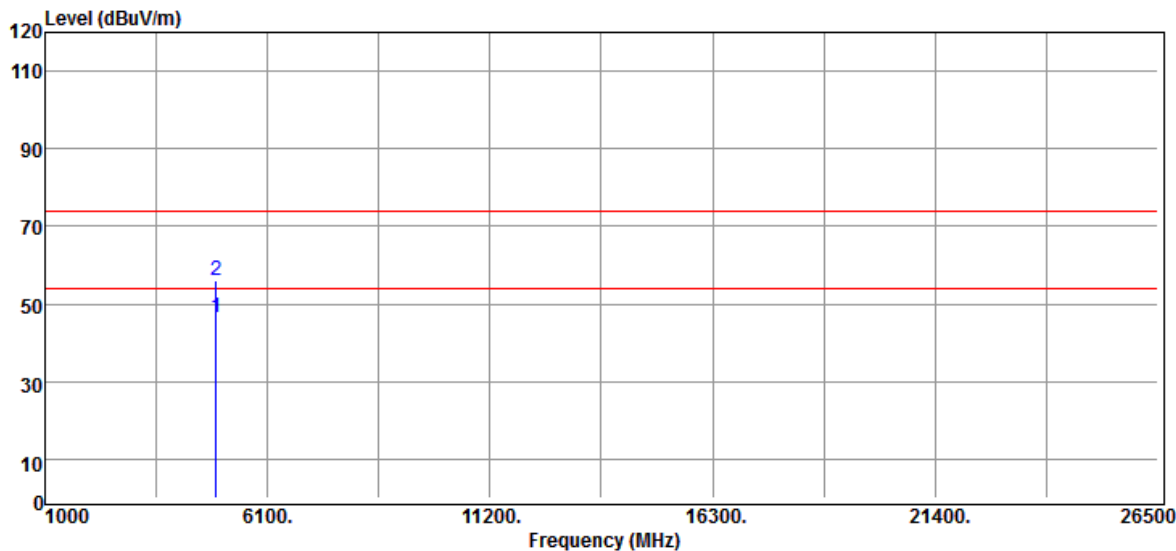
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Operation Mode	:802.11g	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4924.00	Average	33.57	12.78	46.35	54.00	-7.65
4924.00	Peak	43.11	12.78	55.89	74.00	-18.11

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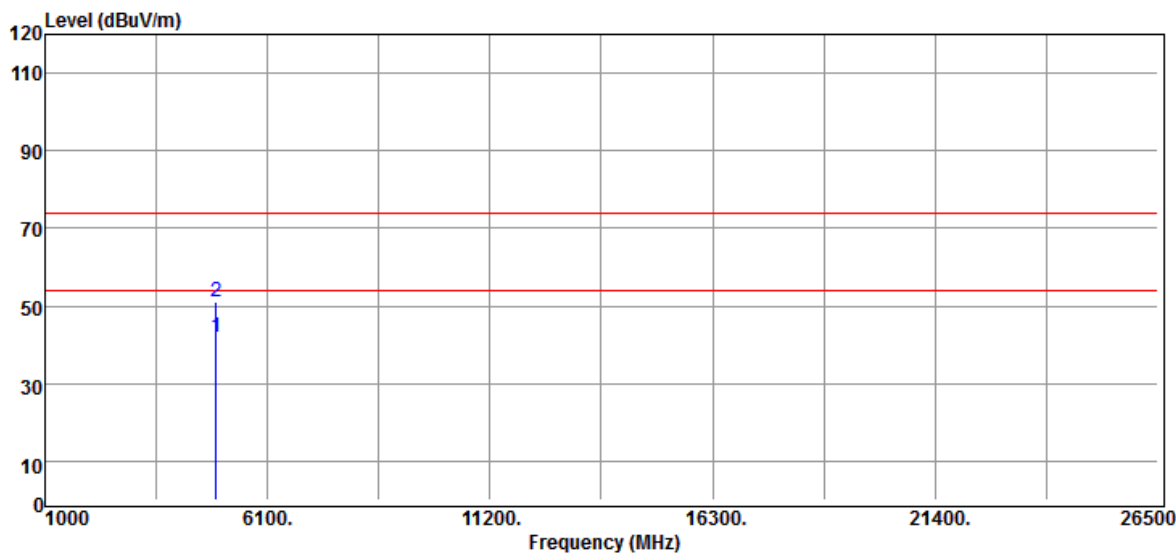
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Operation Mode	:802.11g	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2462 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4924.00	Average	29.30	12.78	42.08	54.00	-11.92
4924.00	Peak	38.39	12.78	51.17	74.00	-22.83

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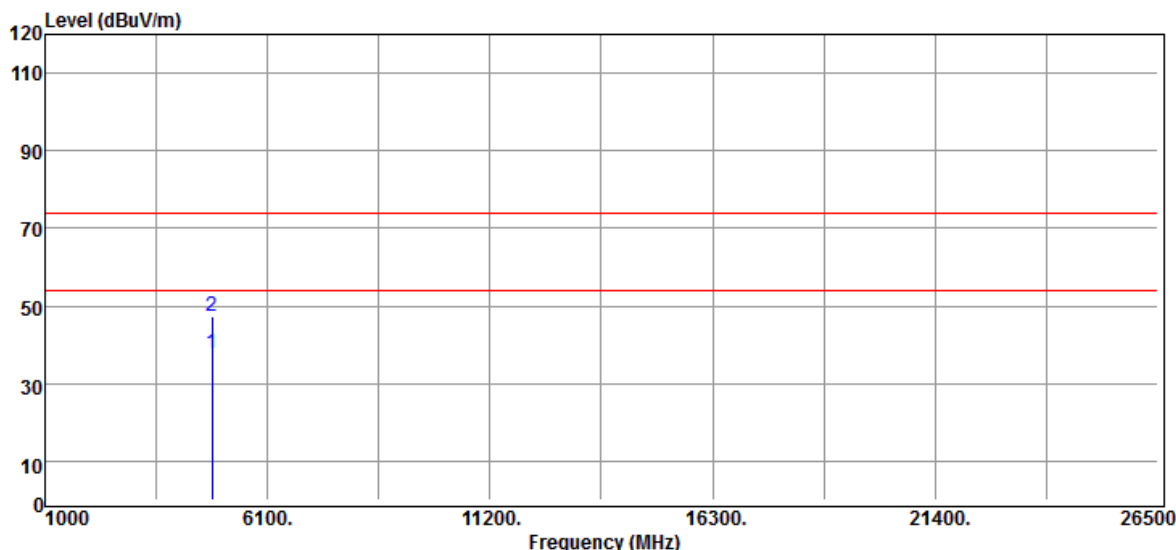
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Operation Mode	:802.11n20	Test Date	:2018-07-24
Test Mode	:TX CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4824.00	Average	25.57	12.38	37.95	54.00	-16.05
4824.00	Peak	34.79	12.38	47.17	74.00	-26.83

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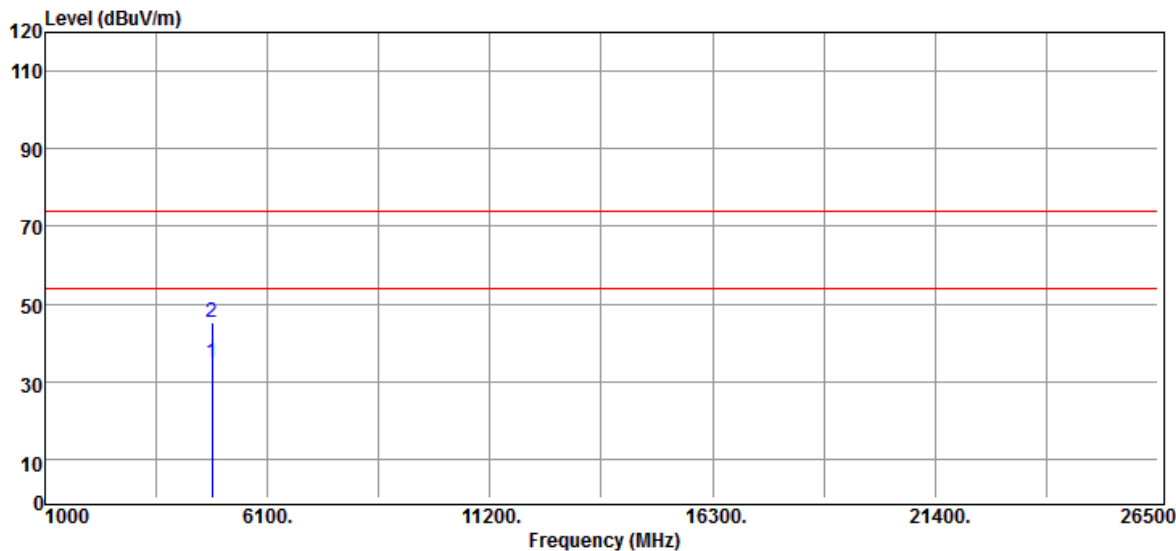
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Operation Mode	:802.11n20	Test Date	:2018-07-24
Test Mode	:TX CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4824.00	Average	22.41	12.38	34.79	54.00	-19.21
4824.00	Peak	32.85	12.38	45.23	74.00	-28.77

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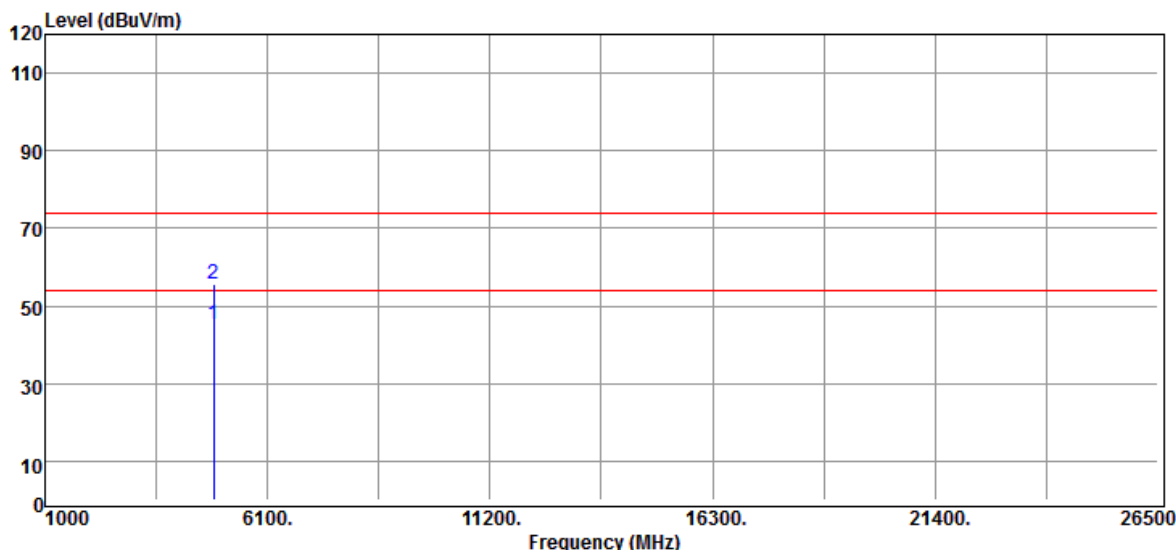
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Operation Mode :802.11n20  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-24  
Temp./Humi. :23/61  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	32.80	12.58	45.38	54.00	-8.62
4874.00	Peak	43.16	12.58	55.74	74.00	-18.26

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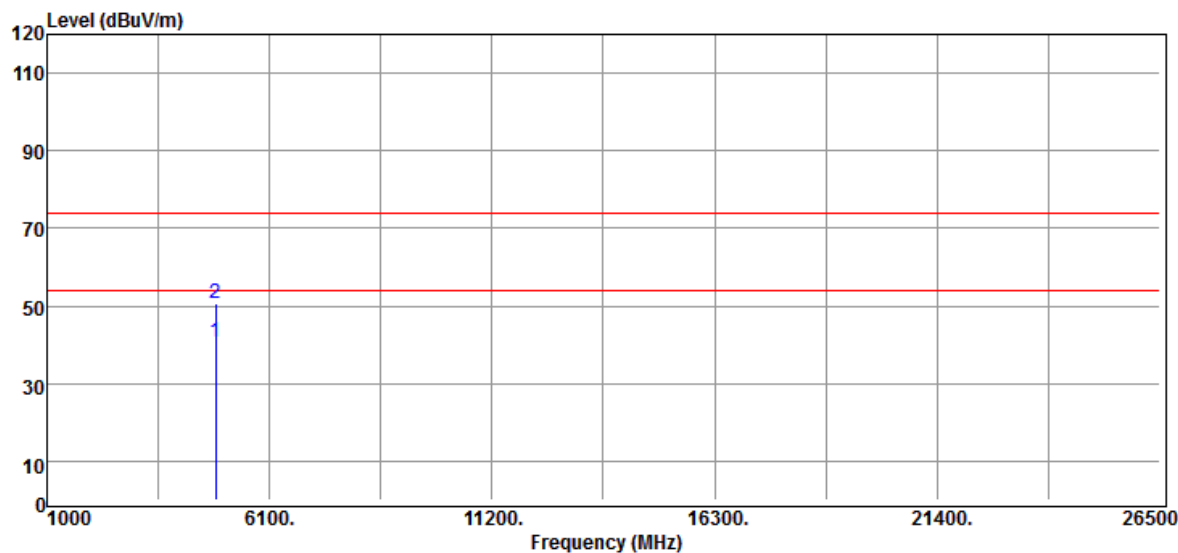
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Operation Mode :802.11n20  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-24  
Temp./Humi. :23/61  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	28.15	12.58	40.73	54.00	-13.27
4874.00	Peak	37.87	12.58	50.45	74.00	-23.55

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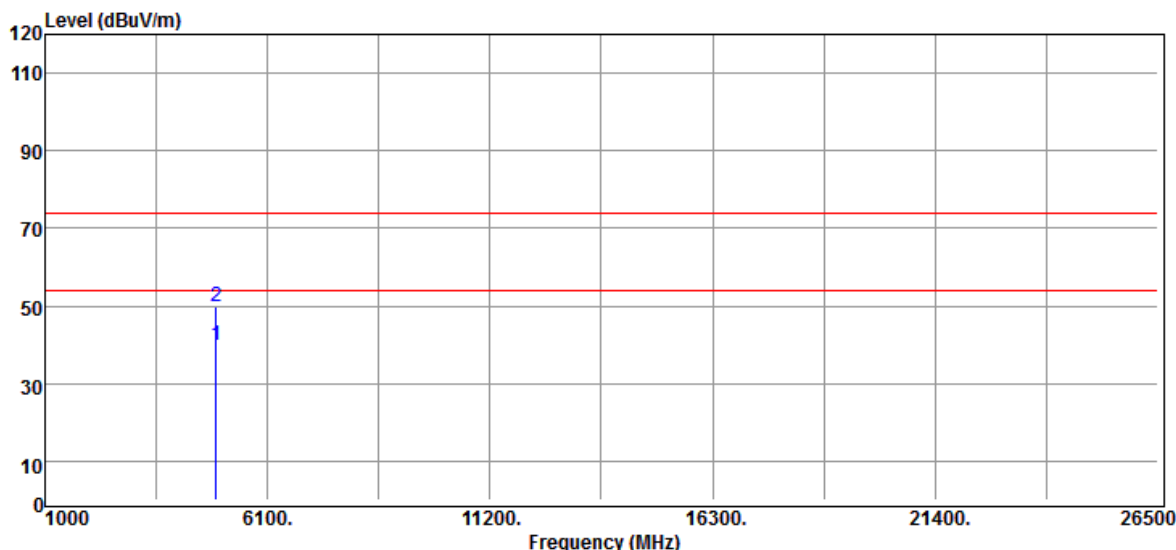
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Operation Mode	:802.11n20	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4924.00	Average	27.02	12.78	39.80	54.00	-14.20
4924.00	Peak	36.92	12.78	49.70	74.00	-24.30

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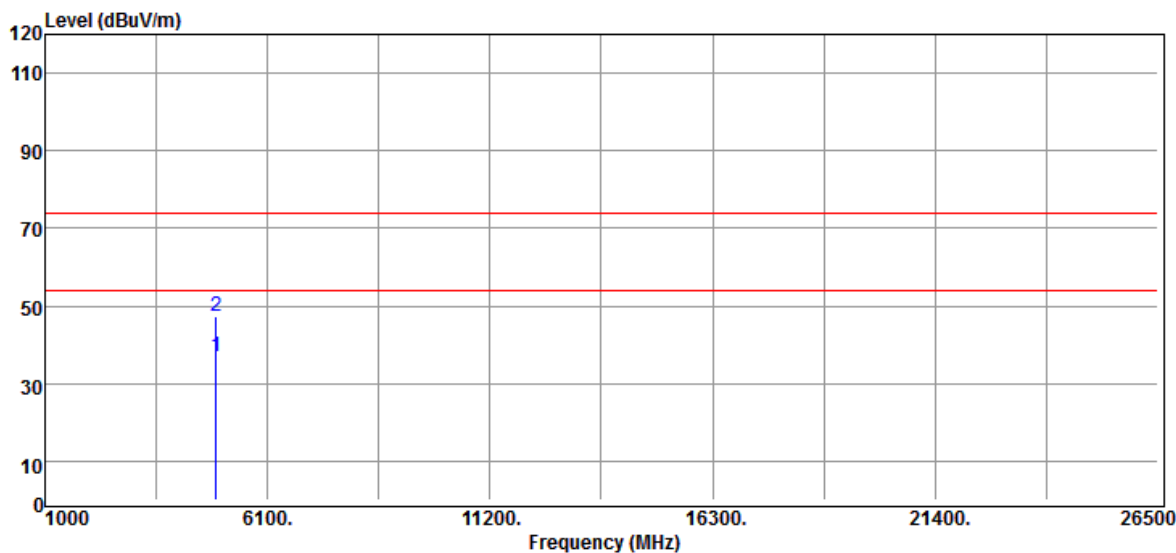
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Operation Mode	:802.11n20	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2462 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4924.00	Average	24.31	12.78	37.09	54.00	-16.91
4924.00	Peak	34.42	12.78	47.20	74.00	-26.80

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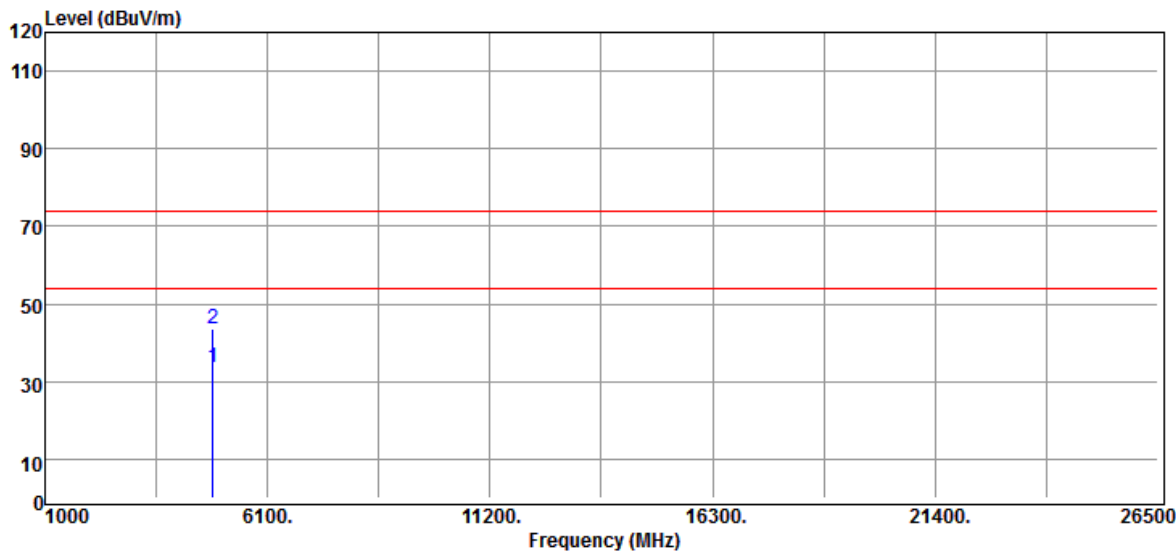
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Operation Mode	:802.11n40	Test Date	:2018-07-24
Test Mode	:TX CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2422 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
4844.00	Average	21.21	12.46	33.67	54.00	-20.33
4844.00	Peak	31.04	12.46	43.50	74.00	-30.50

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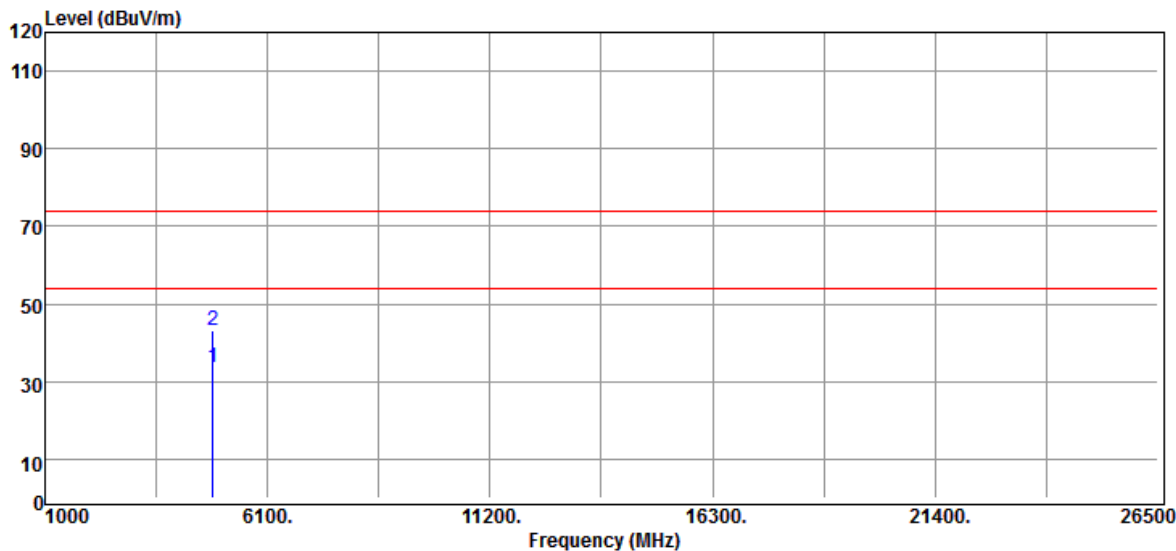
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Operation Mode	:802.11n40	Test Date	:2018-07-24
Test Mode	:TX CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2422 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4844.00	Average	21.08	12.46	33.54	54.00	-20.46
4844.00	Peak	30.62	12.46	43.08	74.00	-30.92

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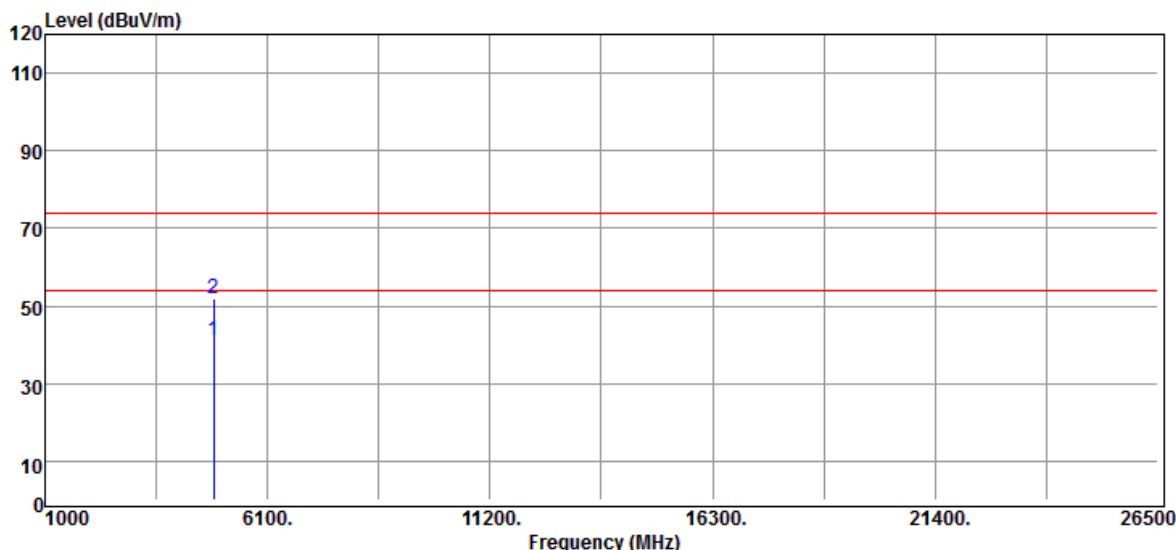
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Operation Mode :802.11n40  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-24  
Temp./Humi. :23/61  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	28.38	12.58	40.96	54.00	-13.04
4874.00	Peak	39.46	12.58	52.04	74.00	-21.96

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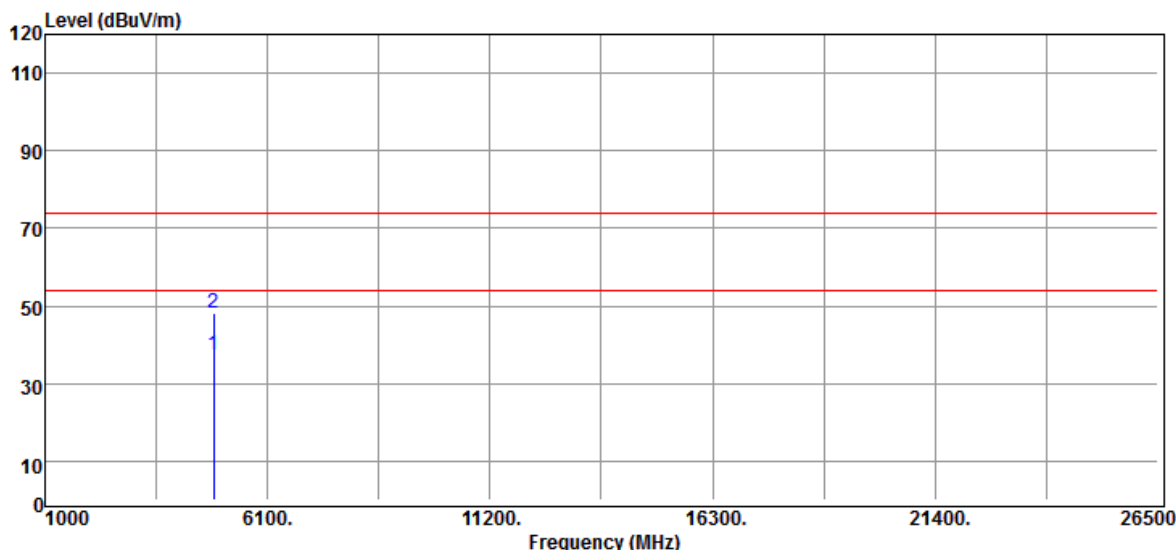
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Operation Mode :802.11n40  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :2437 MHz

Test Date :2018-07-24  
Temp./Humi. :23/61  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4874.00	Average	24.87	12.58	37.45	54.00	-16.55
4874.00	Peak	35.63	12.58	48.21	74.00	-25.79

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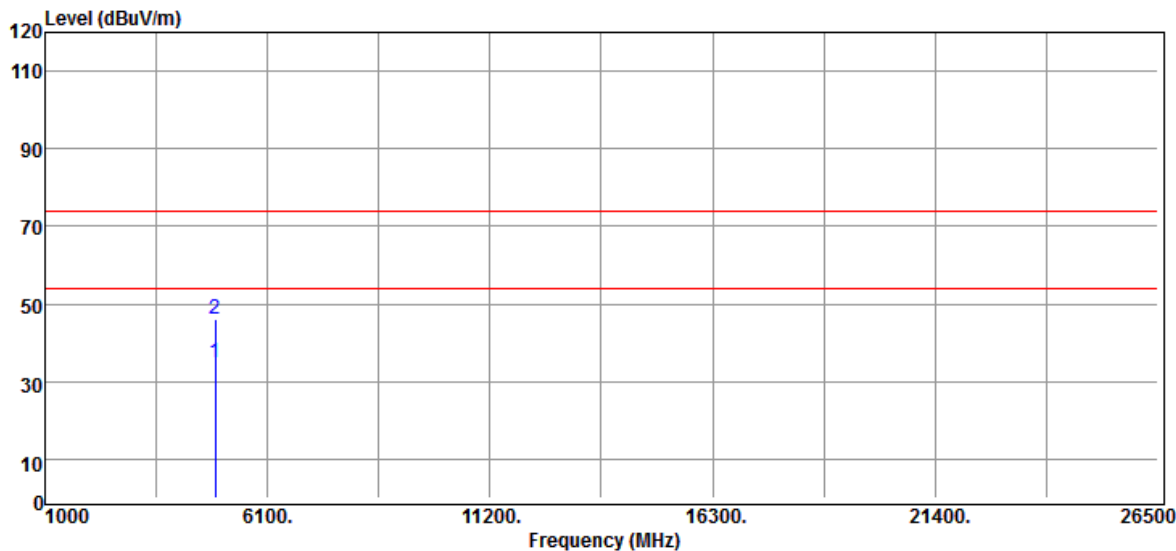
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Operation Mode	:802.11n40	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2452 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4904.00	Average	22.35	12.72	35.07	54.00	-18.93
4904.00	Peak	33.29	12.72	46.01	74.00	-27.99

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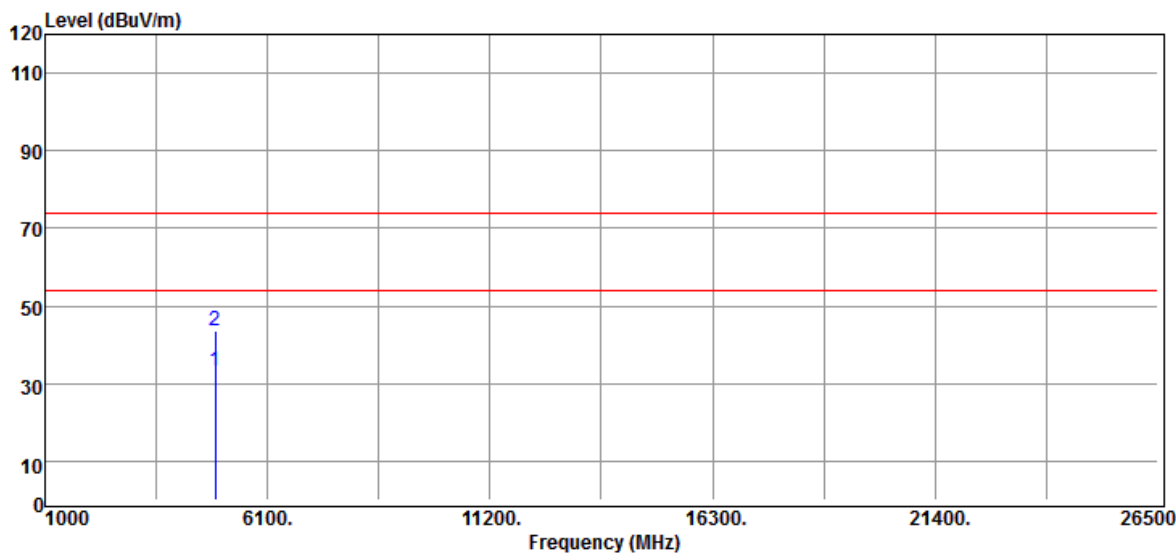
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Operation Mode	:802.11n40	Test Date	:2018-07-24
Test Mode	:TX CH HIGH	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:2452 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4904.00	Average	20.68	12.72	33.40	54.00	-20.60
4904.00	Peak	31.04	12.72	43.76	74.00	-30.24

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## 12 MAXIMUM POWER SPECTRAL DENSITY

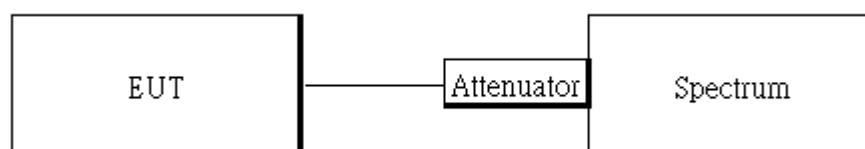
### 12.1 Standard Applicable

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

### 12.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	N9010A	MY51440113	2018/06/20	2019/06/19
DC Power Supply	Agilent	E3640A	MY53130054	2017/09/04	2018/09/03
DC Block	PASTERNAK	PE8210	RF29	2017/12/26	2018/12/25
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25

### 12.3 Test Set-up



### 12.4 Measurement Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 3 kHz & VBW = 10 kHz.
5. For defining Restricted Band Edge Limit:  
Set the RBW = 100kHz & VBW = 300 kHz
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level.
11. 802.11n MIMO mode: offset is set following “measure and add 10 Log (N)” on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

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As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi.

(i) If transmit signals are correlated, then Directional gain  
 $= 10 \log[(10G_1/20 + 10G_2/20 + \dots + 10G_N/20)^2 / NANT] \text{ dBi}$

[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

## 12.5 Measurement Result

POWER DENSITY 802.11b				POWER DENSITY 802.11g			
Freq. (MHz)	PPSD (dBm)	Limit (dBm)	Result	Freq. (MHz)	PPSD (dBm)	Limit (dBm)	Result
2412	-3.83	7.92	PASS	2412	-3.77	7.92	PASS
2437	-3.90	7.92	PASS	2417	-4.57	7.92	PASS
2462	-3.95	7.92	PASS	2437	-3.30	7.92	PASS
				2457	-4.13	7.92	PASS
				2462	-5.40	7.92	PASS
POWER DENSITY 802.11n HT20				POWER DENSITY 802.11n HT40			
Freq. (MHz)	PPSD (dBm)	Limit (dBm)	Result	Freq. (MHz)	PPSD (dBm)	Limit (dBm)	Result
2412	-9.18	7.92	PASS	2422	-14.61	7.92	PASS
2417	-1.95	7.92	PASS	2427	-12.368	7.92	PASS
2437	-2.38	7.92	PASS	2432	-10.696	7.92	PASS
2457	-1.96	7.92	PASS	2437	-5.49	7.92	PASS
2462	-9.59	7.92	PASS	2442	-9.721	7.92	PASS
				2447	-11.555	8.00	PASS
				2452	-11.5	8.00	PASS

offset 11.00 dB for SISO mode  
offset 14.00 dB for MIMO mode

\*Refer to next page for plots

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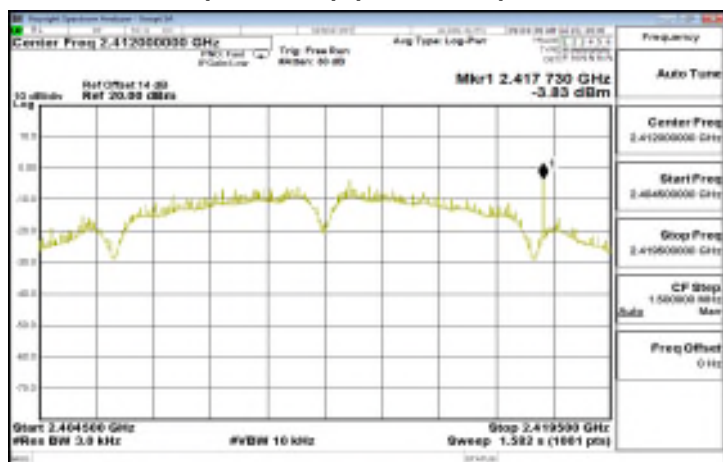
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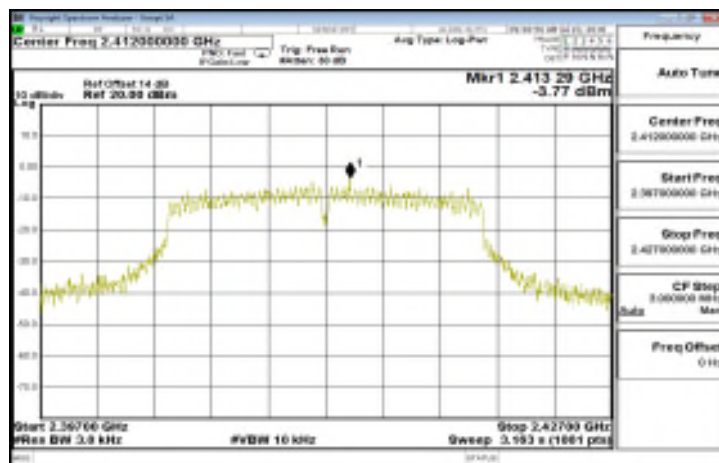
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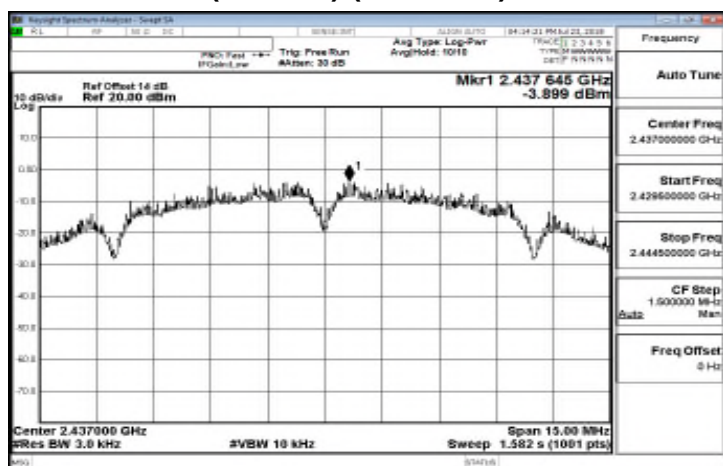
### 802.11b PSD(CH-Low) (2412MHz)



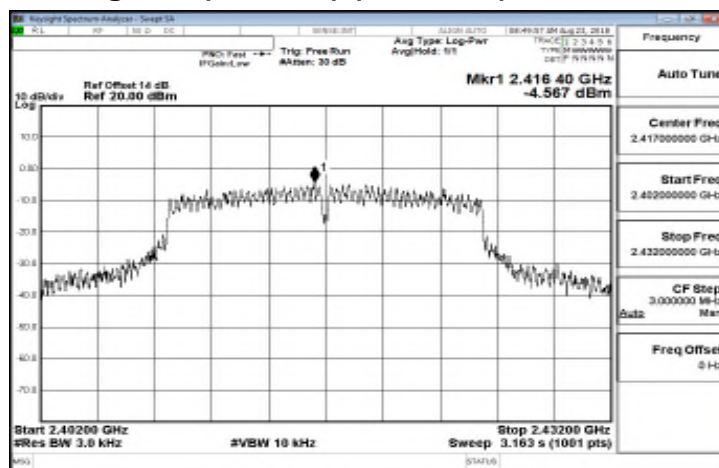
### 802.11g PSD(CH-Low) (2412MHz)



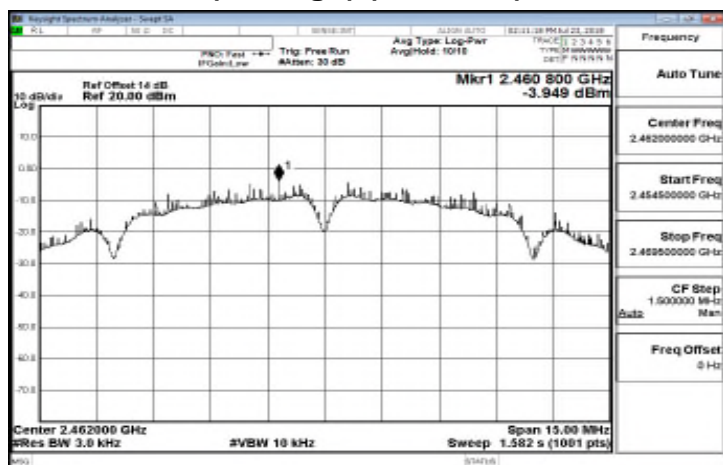
### 802.11b PSD (CH-Mid) (2437MHz)



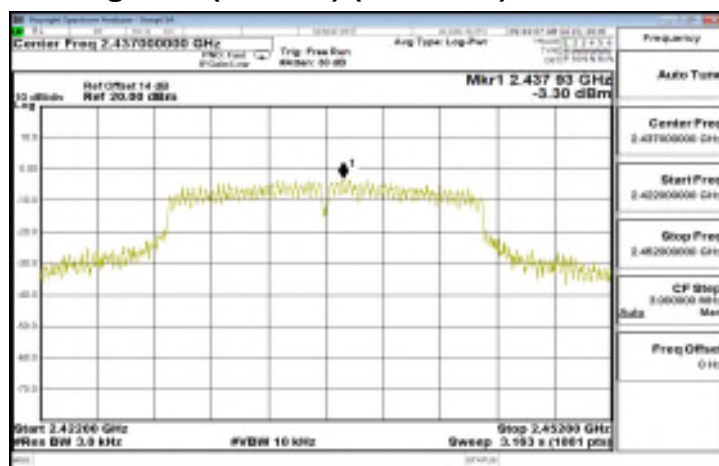
### 802.11g PSD(CH-Low) (2417MHz)



### 802.11b PSD (CH-High) (2462MHz)



### 802.11g PSD (CH-Mid) (2437MHz)



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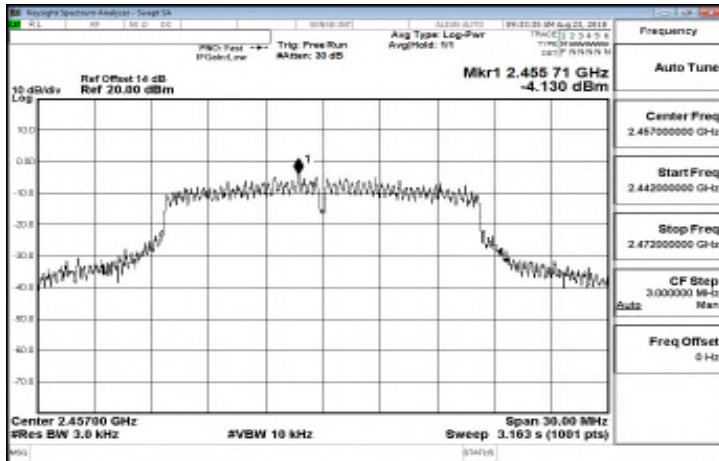
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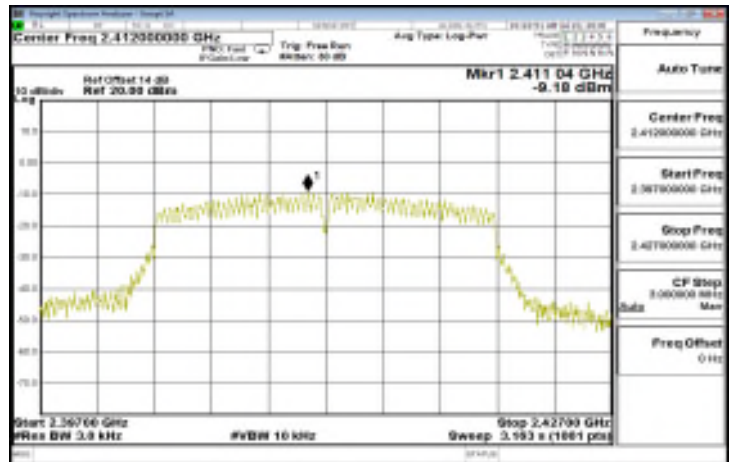
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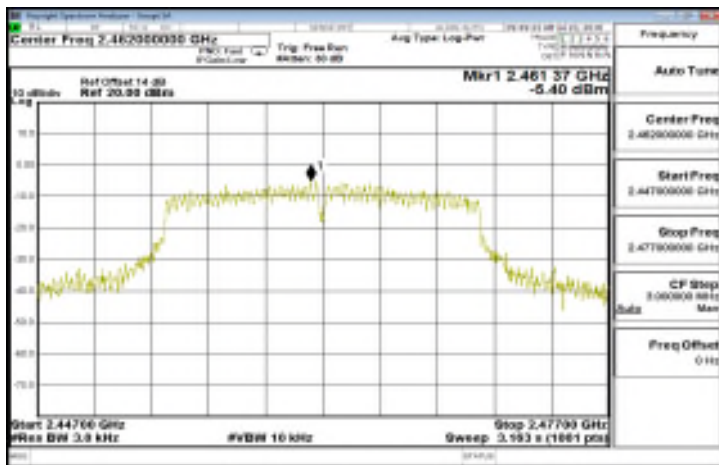
### 802.11g PSD (CH-High) (2457MHz)



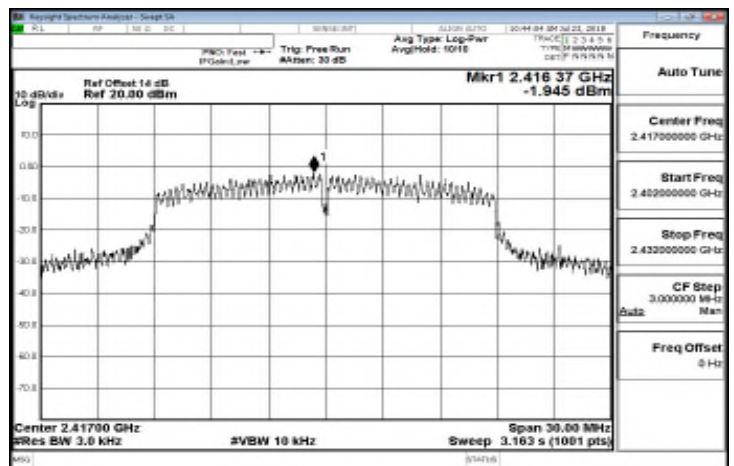
### 802.11n\_HT20 PSD (CH-Low) (2412MHz)



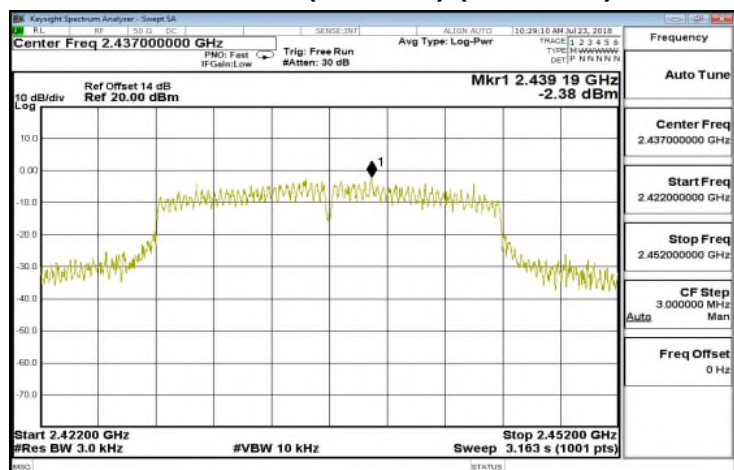
### P802.11g PSD (CH-High) (2462MHz)



### 802.11n\_HT20 PSD (CH-Low) (2417MHz)



### 802.11n\_HT20 PSD (CH-Low) (2437MHz)



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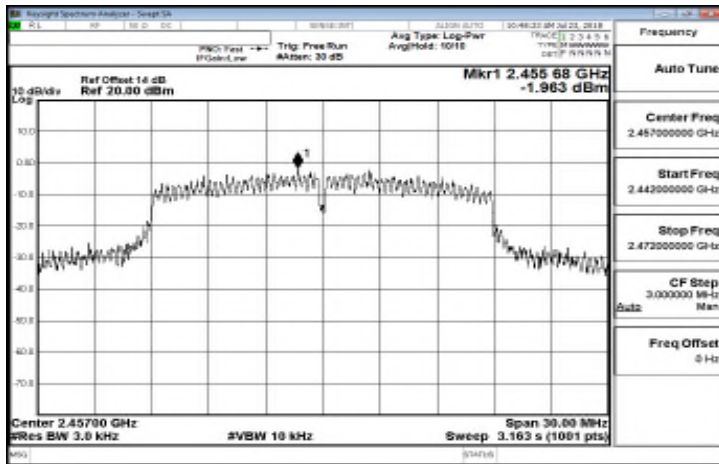
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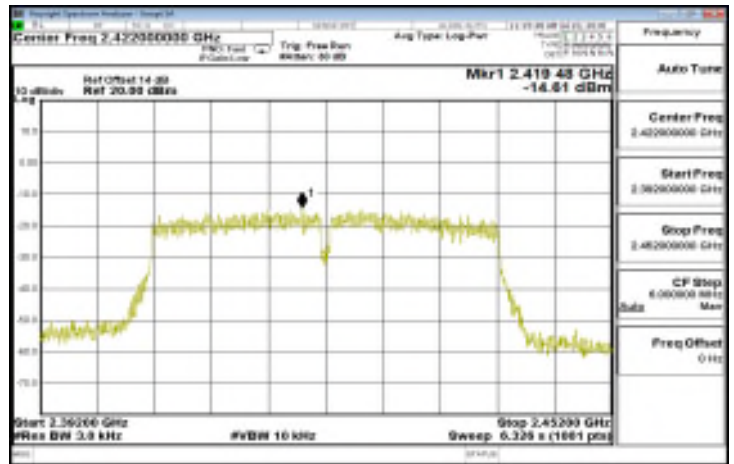
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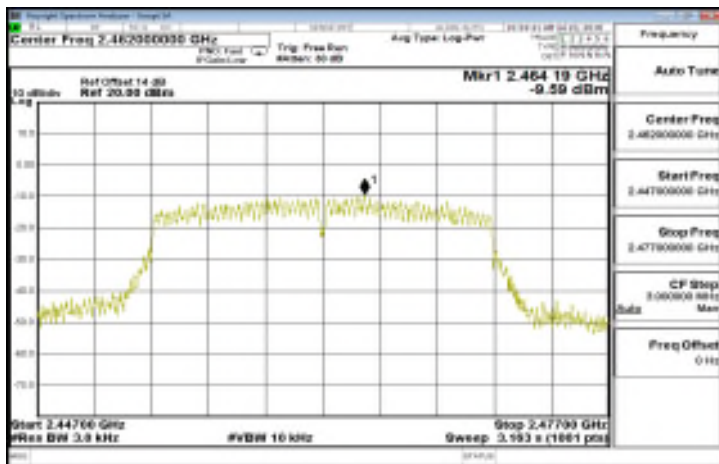
### 802.11n\_HT20 PSD (CH-High) (2457MHz)



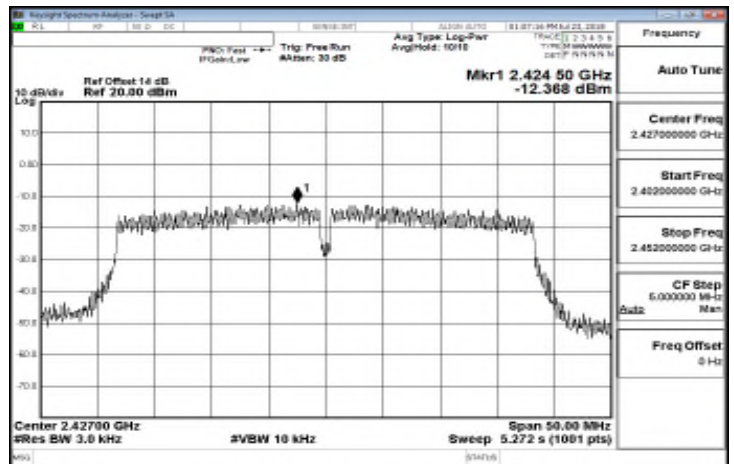
### 802.11n\_HT40 PSD (CH-Low) (2422MHz)



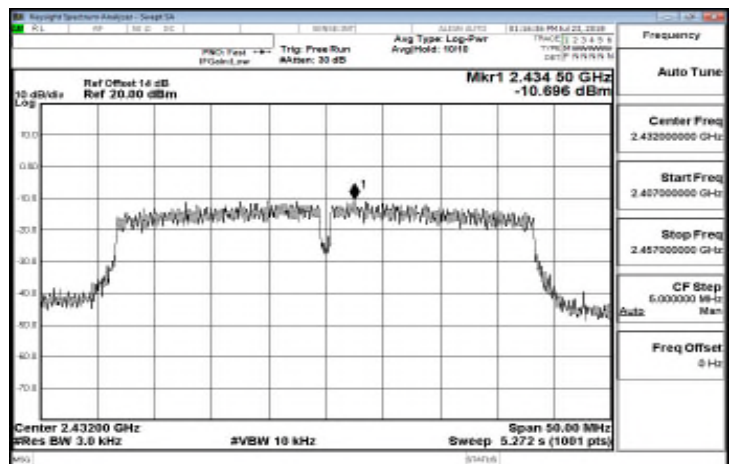
### 802.11n\_HT20 PSD (CH-High) (2462MHz)



### 802.11n\_HT40 PSD (CH-Low) (2427MHz)



### 802.11n\_HT40 PSD (CH-Low) (2432MHz)



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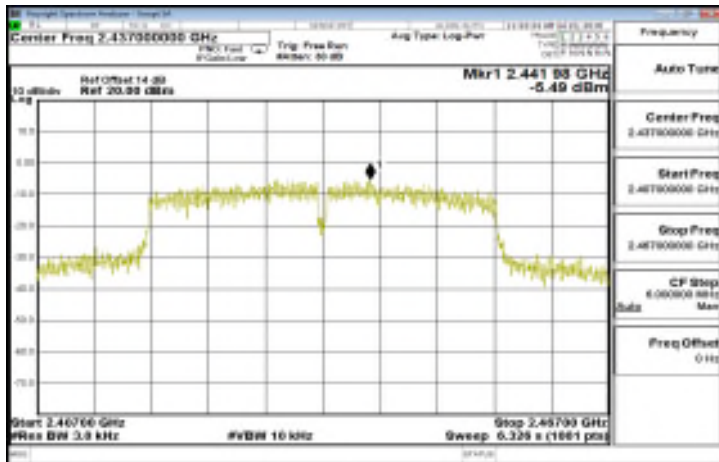
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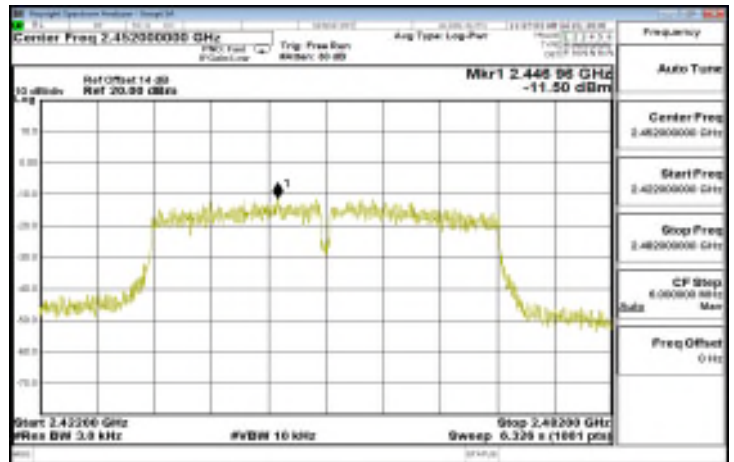
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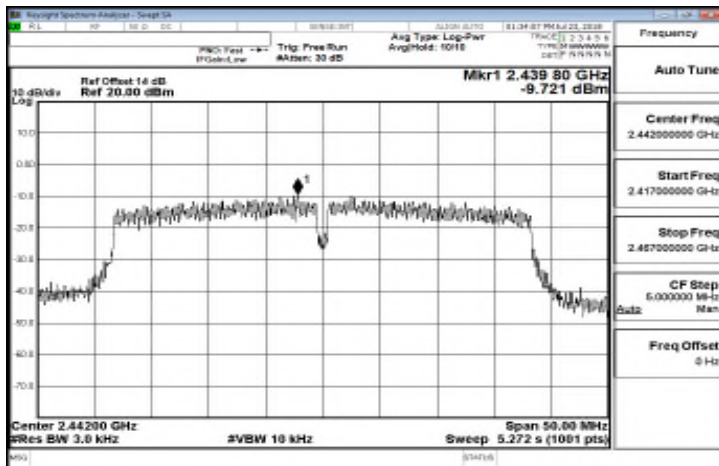
### 802.11n\_HT40 PSD (CH-Mid) (2437MHz)



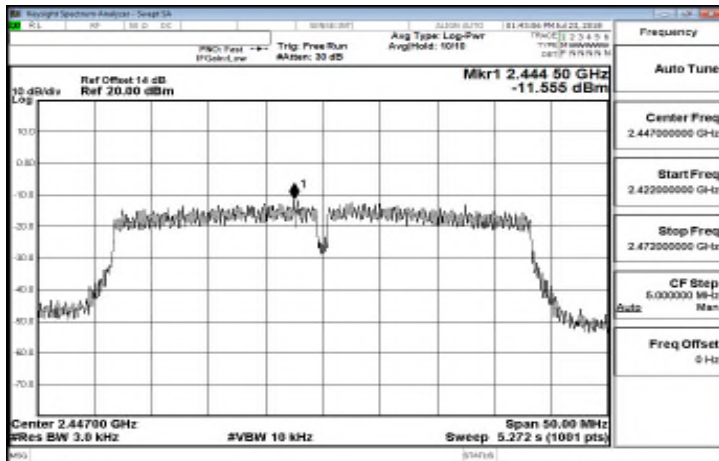
### 802.11n\_HT20 PSD (CH-High) (2452MHz)



### 802.11n\_HT20 PSD (CH-High) (2442MHz)



### 802.11n\_HT20 PSD (CH-High) (2447MHz)



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## 13 ANTENNA REQUIREMENT

### 13.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

### 13.2 Antenna Connected Construction

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT ph

*~ End of Report ~*

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